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Rough estimate of the climate change mitigation potential of the CAP Strategic Plans (EU-27) over the 2023-2027 period

May 2025

Funded by the European Union

Recommended citation:

EUROPEAN COMMISSION – Directorate-General for Agriculture and Rural Development – Unit A.3 (2025): Rough estimate of the climate change mitigation potential of the CAP Strategic Plans (EU-27) over the 2023-2027 period – Report.

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Summary of highlights

This study examines the CAP Strategic Plans (CSP) adopted under the 2023-2027 CAP programming period (entered into force on 1 January 2023) and analyses their potential contribution to reducing greenhouse gas (GHG) emissions, enhancing carbon removals and conserving existing carbon stocks. It establishes for the first time the link between CSP planned instruments (good agricultural and environmental conditions standards and CAP interventions) and their mitigation potential at EU level, representing a starting point for the development of a further refined methodology using Member State data, and for the improvement in their GHG emissions and removals inventories. The study does not account for the contribution of other policies and measures implemented in Member States beyond the CSPs in terms of their mitigation or protection potential.

Context and methodology

- According to data reported by Member States of the EU under the EU Governance Regulation (EU) 2018/1999 [1], on average over the 2018-2022 period, the agricultural sector [2] is estimated to have emitted annually 377 million tonnes (Mt) of carbon dioxide equivalent (CO_2e), accounting for 12% of the estimated EU's total GHG emissions, with two thirds emitted by the livestock sector (enteric fermentation and manure management) (European Environment Agency, 2024) [3]. Land use, land use change and forestry (LULUCF) sector activities [4] are estimated to have removed 243 Mt net of CO_2e from the atmosphere annually on average over the 2018-2022 period, equal to 7% of the EU's annual estimated GHG emissions, among which LULUCF categories cropland, grassland and wetland are net sources of emissions estimated to have emitted 61 Mt CO_2e, accounting for 1.9% of EU's annual estimated GHG emissions.
- To enhance the contribution of the EU farming sector to EU climate objectives, multiple CSP instruments were designed to increase carbon sinks and reduce emission sources. In addition, in the CSPs, 32% of the total CAP funding is aimed to be devoted to delivering benefits for the climate, water, soil, air, biodiversity and animal welfare, and to encourage practices beyond the mandatory conditionality.
- The methodology applied in this study is based on programming data extracted from the CSPs [5] on rough estimates of uptake levels and average emission and removal coefficients of farming practices. For that purpose, farming practices are assigned coefficient values representing their estimated potential contribution in terms of reducing GHG emissions, enhancing carbon removals or protecting carbon stocks, in comparison to a reference conventional farming practice. These coefficients are mainly derived from a systematic analysis of available meta-reviews of the scientific literature, implemented by the European Commission's Joint Research Centre (JRC).
- The study establishes the link between CSP instruments and their mitigation potential in 27 Member States (EU-27). Results depend on the availability of the coefficients and enough information in the CSP on the area covered by the various farming practices. This represents a starting point for deriving the mitigation potential of planned actions. Further refinements in methodology, such as the use of local coefficients and data on the actual uptake of the interventions, will improve the accuracy of the estimates. **Concerning CAP direct supports, the estimated potential contribution encompasses all the areas where farming and forestry practices [6] supported through various types of intervention are planned.** This includes areas where these practices would be adopted even without financial support or were already supported under the previous CAP programming period. As a consequence, results cannot fully be considered an assessment of the additional effect of the CAP.
- At this stage, the results provide a preliminary indication of the CSPs' overall potential contribution and should be interpreted with caution. Conservative choices were made during the estimation process. This includes accounting for the risk of double counting in cases of possible overlap between farming practices and setting the coefficient value of farming practices or the estimated potential uptake area to zero when data available are insufficient.
- Potential effects of the CSP instruments on GHG emissions and removals are differentiated from those on carbon protection, and results for both categories are kept separate.

[1] Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) N° 663/2009 and (EC) N° 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) N° 525/2013 of the European Parliament and of the Council (Text with EEA relevance.), OJ L 328, p. 1-77, ELI: http://data.europa.eu/eli/reg/2018/1999/oj.

[2] Agriculture sector emissions encompass those generated directly from agricultural practices. This includes methane emissions from livestock activities such as enteric fermentation and manure management, nitrous oxide emissions from synthetic fertilisers applied to soils and rice cultivation.

[3] The data from the European Environment Agency can be accessed at: https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emissions-from-agriculture. The website was consulted in January 2025. The values are derived from the 2024 GHG inventory submission to the UNFCCC (referring to GHG emissions in 2022).

[4] LULUCF sector emissions and removals involve changes in land use and forest management that affect carbon storage and emissions. This sector includes activities like deforestation, afforestation, reforestation and soil carbon changes due to land use. While LULUCF often functions as a net carbon sink, certain activities – such as the conversion of croplands and grasslands – contribute to net emissions.

[5] CSPs as approved by the European Commission in December 2022 for 19 CSPs: Austria, Belgium-Flandres, Belgium-Wallonia, Czechia, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Netherlands, Poland, Portugal, Romania, Spain and Sweden. CSPs as amended in October 2023 for six CSPs: Croatia, Cyprus, Luxembourg, Malta, Slovenia and Slovakia. CSPs as amended in July 2024 for three CSPs: Bulgaria, Estonia and Lithuania.

[6] In this report, farming and forestry practices will be referred to as farming practices, without specifying each time that it also includes forestry.

The analysis indicates a potential positive contribution of the 28 CSPs (which correspond to 27 Member States) to GHG emission reduction and enhanced removal of 35.0 Mt CO_2e per year on average over the 2023-2027 period.

- This positive contribution is clearly only a potential contribution and comes at this stage with a range of uncertainties due to the numerous assumptions made. In particular, the extent to which this annual positive contribution can be cumulated until 2027 strongly depends on the additionality of the actual uptake of practices by farmers year on year.
- In terms of practices, conversion to organic farming (O12), crop rotation (R11) or diversification (R14), expansion of cover crops (S22, S23X, S232 and S25) [7] and the use of compost (F46) contribute 74% of the estimated mitigation potential.
- In terms of instruments, eco-schemes account for 39% of the estimated mitigation potential, ENVCLIM interventions 28%, and good agricultural and environmental conditions (GAEC) compliance 28% (notably GAEC 6 (soil cover) and GAEC 7 (crop rotation on arable land)). Coupled income support (CIS) and INVEST interventions are expected to contribute to the mitigation potential only in a few CSPs.
- Results are aggregated according to the United Nations Framework Convention on Climate Change (UNFCCC) Common Reporting Format (CRF) categories developed for the inventories of GHG emissions and removals. Although the correspondence is not always straightforward because the methodology employed in this study deviates from UNFCCC inventory methodologies [8], this provides the possibility of contextualising the potential contribution of CSP with emissions and removals reported through national annual inventories.
  - The analysis shows that 79% of the total estimated mitigation potential contribution is associated with CRF category 4.B (LULUCF-Cropland), which corresponds to the storage of carbon in cropland soils. This estimated potential contribution accounts for 21% of the total emissions reported on average over the 2018-2022 period under the agricultural and LULUCF sectors [9].
  - The second-largest estimated potential contribution is a reduction of non-CO_2 emissions from agricultural soils (CRF category 3.D (agricultural soils)), accounting for 14% of the total estimated mitigation potential contribution.
  - The estimated potential mitigation contribution of CSPs, through carbon sequestration and associated with the CRF category 4.D (wetlands), accounts for 4% of the estimated mitigation potential.
  - The estimated potential mitigation contribution of CSPs associated with the CRF categories 3.A (enteric fermentation) and 3.B (manure management) are expected to be low. This is particularly notable given that emissions from livestock represent a significant share of non-CO_2 emissions of the agricultural sector in some Member States, and accounting for 66% of emissions reported on average over the 2018-2022 period in CRF sector 3 (agriculture). However, this study does not assess other policies and measures programmed by Member States to reduce emissions from livestock.

Even if the comparison cannot be made directly for some methodological inconsistencies between the approach developed and the Intergovernmental Panel on Climate Change (IPCC) methodological guidance, **the estimates can be contextualised against EU climate targets set in the Effort Sharing Regulation (ESR) (EU) 2018/842** [10] **and LULUCF Regulation (EU) 2018/841** [11]. This can give the possibility to derive insights on the complementarity with other policies at EU and National level, on the ambition toward EU commitments.

- Although the ESR does not entail targets for the agricultural sector, in certain countries, agricultural mitigation is crucial for meeting the 2030 target. At EU level, the estimated potential to mitigate non-CO_2 emissions (5 Mt CO_2e per year) represents 1.4% of reported emissions from agriculture (CRF sector 3, 2018-2022 average). This also accounts for 32% of the distance between the current emissions levels reported in national inventories and the 2030 emission level for the agricultural sector defined in the impact assessment of the Fit for 55 package [12].
- For the LULUCF sector, the LULUCF Regulation (EU) 2018/841 sets an EU-wide net removal target of 310 Mt CO_2e by 2030, which, based on the sector's average sink between 2016 and 2018, requires an increase in carbon sink capacity of 42 Mt CO_2e. The analysis suggests that the CSPs could contribute to carbon sequestration by approximately 30 Mt CO_2e per year. This represents 10% of the LULUCF 2030 target and 71% of the required increase in sink capacity.
- The potential contribution of the CSPs is estimated on a yearly basis. This entails that the CSPs' potential contribution to emissions reduction and increased removals objectives could be delivered every year from 2023 to 2027, making the contribution quite significant. However, whether this potential will fully be realised and the magnitude of the contribution to the 2030 LULUCF target and ESR emission level for the agricultural sector defined in the impact assessment of the Fit for 55 package, will depend on the final uptake of the measures by farmers, whether supported practices will have additional effects every year and whether the practices were already financed under the previous CAP programming period (i.e. deadweight effect), which is not possible to assess at this stage. Actions outside CSPs will also contribute to the 2030 emission and removal levels.

[7] S22 – Crop residues left on soil, leaving stubbles on the field, S23X – Cover crops, S232 – Winter cover crop, S25 – Green cover on permanent crops.
[8] The primary distinction lies in the scope: this study focuses exclusively on the utilised agricultural area (UAA) receiving CAP aid, rather than the entire national territory covered in the national inventories. Additionally, the coefficients used in this study are custom estimates, with a single coefficient applied across the entire EU. This approach differs from the country-specific coefficients employed in national inventories.
[9] See footnote 3.
[10] Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) N° 525/2013 (Text with EEA relevance), OJ L 156, p. 26-42, ELI: http://data.europa.eu/eli/reg/2018/842/oj.
[11] Regulation (EU) 2018/841 of the European Parliament and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from Land Use, Land Use Change and Forestry in the 2030 climate and energy framework, and amending Regulation (EU) N° 525/2013 and Decision N° 529/2013/EU (Text with EEA relevance), OJ L 156, p. 1-25, ELI: http://data.europa.eu/eli/reg/2018/841/oj.
[12] European Commission, Commission Staff Working Document – Impact assessment report - Part 3 Accompanying the document Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Securing our future - Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society, 2024, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52024SC0063.

In addition to contributing to enhanced carbon removal and GHG emissions mitigation, the 28 CSPs could potentially contribute to the protection of existing carbon sinks, with an estimated potential of 32.0 Mt CO_2e per year, on average, over the 2023-2027 period.

- The CSPs' GAEC standards and interventions also seek to protect the carbon stored in soil (grassland, peatlands, arable land) and woody features (forests, hedgerows) by maintaining these areas and encouraging sustainable management.
- Support to the maintenance of organic farming (O11) [13] accounts for more than half (54%) of the estimated potential, followed by forestry (Y2X, Y12, Y22) [14] maintenance or sustainable management (23%) and grassland protection (17%).
- Maintenance of organic farming is supported through ENVCLIM and eco-scheme interventions, whereas the INVEST interventions contribute to support sustainable forest management in certain Member States.
- In the case of GAECs, due to the difficulty to quantify their contribution against a baseline, such as for GAEC 1 (maintenance of permanent grassland), an obligation in place for many years, and the lack of information on the areas potentially concerned for GAEC 2 (protection of wetlands and peatlands), the applied conservative approach shows a small net additional potential contribution (these measures are mostly to maintain carbon in soils).

[13] Farming practice O11 – Maintenance of organic farming practices.
[14] Y2X – Forest management, Y12 – Maintenance of afforested land, Y22 – Sustainable Forest management (e.g. for biodiversity, carbon sequestration, fire, genetic resources, clearance).

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List of acronyms

CAP	Common Agricultural Policy
CIS	Coupled income support
CH_4	Methane
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CRF	Common Reporting Format
CSP	CAP Strategic Plan
DG AGRI	Directorate-General for Agriculture and Rural Development
EEA	European Environment Agency
EU-27	EU 27 Member States
ESR	Effort Sharing Regulation (EU) 2018/842
GAEC	Good agricultural and environmental conditions
GHG	Greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
JRC	European Commission's Joint Research Centre
LULUCF	Land use, land-use change and forestry
N_2O	Nitrous oxide
SOC	Soil organic carbon
UAA	Utilised agricultural area
UNFCCC	United Nations Framework Convention on Climate Change

Units of measurements

ha	Hectare
kg	Kilogramme
kt	Kilotonne (1 000 t)
MW	Megawatt
Mt	Megatonne (1 000 kt)
t	Tonne
yr	Year

Acknowledgements

The report 'Rough estimate of the climate change mitigation potential of the CAP Strategic Plans (EU-27) over the 2023-2027 period' has been developed in the framework of the EU CAP Network supported by the European Evaluation Helpdesk for the CAP.

The work was coordinated by Laura Nocentini and co-authored by Adrien de Pierrepont, Laura Baccou and Victor Kieffer (Oréade-Brèche). Valuable input was provided by Jeremy Wiltshire, Fiona Dowson, Jessie Willcocks, Tayla David, Keesje Avis, Hugh Loughnan and Tanis Slattery-Penfold (Ricardo).

We also extend our thanks to Lucie Royer and Kaley Hart for their review of the report.

Representatives from the European Commission's Directorate-General for Agriculture and Rural Development (DG AGRI) and the Joint Research Centre (JRC) contributed to the coherence and consistency of the final report with the EU's policy framework.

Questions and suggestions regarding the content of the publication can be addressed to the European Evaluation Helpdesk for the CAP at evaluation@eucapnetwork.eu.

1. Introduction

According to data reported by Member States of the EU under the EU Governance Regulation (EU) 2018/1999 [15], on average over the 2018-2022 period, the agricultural sector is estimated to have emitted 377 Mt of carbon dioxide equivalent (CO_2e) per year, accounting for 12% of the estimated EU's total greenhouse gas (GHG) emissions including international transport. Methane (CH_4) emissions from enteric fermentation and nitrous oxide (N_2O) emissions from soils are estimated to be responsible for 49% and 30% of total agricultural GHG emissions, respectively. Non-CO_2 emissions from manure management are the third largest source, accounting for an estimated 17% of total agricultural GHG emissions. The remaining sources are estimated to make relatively small contributions, accounting for less than 4% of agricultural estimated GHG emissions in total [16].

The land use, land-use change and forestry (LULUCF) sector primarily involves activities that sequester and protect carbon in land and biomass (i.e. carbon sink), such as forestry (afforestation and reforestation). On average, over the 2018-2022 period, the LULUCF sector is estimated to have removed 243 Mt CO_2e annually, mainly through removals in forestry. Among the LULUCF sector, the LULUCF categories cropland, grassland and wetland are estimated to be net emitters (by nearly 61 Mt CO_2e yearly).

The 2023-2027 CAP is a key tool for reaching the European Green Deal goals [17]. In particular, it includes the Specific Objective 'to contribute to climate change mitigation and adaptation, including by reducing GHG emissions and enhancing carbon sequestration, as well as to promote sustainable energy' [18]. In addition, in the CAP Strategic Plans (CSP), 32% of the total CAP funding is aimed to be devoted to delivering benefits for the climate, water, soil, air, biodiversity and animal welfare, and to encourage practices beyond the mandatory conditionality.

This underscores the necessity of improving methodologies for evaluating the contribution of the CSPs to climate change mitigation.

The current estimation of GHG emissions from the agricultural sector in the EU GHG inventories carried out within the framework of the UNFCCC is mostly based on 'Tier 1' and 'Tier 2' methodologies [19]. A recent preliminary analysis carried out by DG AGRI mapping the methods used to report agricultural emissions to the UNFCCC [20] points out the need for higher tier reporting and more disaggregated activity data to reflect the potential mitigation contribution of measures in the CSPs. In addition, the European Environment Agency (EEA) [21] points to uncertainties in the estimation of GHG emissions at EU level. Tables 1.16, 5.59 and 6.32 of the EEA publication [22] provide information on the EU uncertainty estimates (level and trend uncertainty). The tables indicate a significant level of uncertainty, particularly for N_2O emissions and CO_2 in cropland, which also demonstrates the need for improvement.

In this context, this study contributes to methodologies that can further analyse and better quantify the potential contribution of certain farming practices to climate change mitigation.

Box 1. EU climate change mitigation objectives

EU Climate Law (EU) 2021/1119 [23]

The European Climate Law sets out the EU's commitment to transition to a climate-neutral economy by 2050, with an intermediate target to reduce GHG emissions by at least 55% by 2030 compared to 1990 levels.

Effort Sharing Regulation (EU) 2018/842 (ESR) [24]

Agriculture GHG emissions, except those from land use, are covered by the ESR, which mandates an overall GHG reduction target of 40% compared to 2005 levels by 2030. The target is distributed among Member States. Although there is no specific target solely for agriculture within the ESR, some Member States [25] have independently set national targets for reducing agricultural emissions.

LULUCF Regulation (EU) 2018/841 [26]

The LULUCF regulation aims to achieve a net greenhouse gas removal target of 310 Mt CO_2e by 2030. To fill in the gap of 42 Mt CO_2e to reach this target, the regulation sets national contributions for 2030.

Methane Pledge [27]

The EU is one of the initiators of the Global Methane Pledge, launched in 2021 ahead of COP26. The pledge aims to reduce global methane emissions by 30% by 2030 compared to 2020 levels. Reducing methane from the livestock sector is key to achieving this goal.

Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025)

[15] See footnote 1.
[16] See footnote 3. Animal sector emissions are emissions reported under IPCC sectors 3.A (enteric fermentation) and 3.B (manure management).
[17] European Commission, Directorate-General for Agriculture and Rural Development, *Report from the commission to the European Parliament and the Council – Summary of CAP Strategic Plans for 2023-27: joint effort and collective ambition*, Publications office of the European Union, 2023, https://op.europa.eu/en/publication-detail/-/publication/a0b0a342-89e9-11ee-99ba-01aa75ed71a1/language-en.
[18] See Article 6(d) of the CAP Strategic Plans Regulation (EU) 2021/2115 of the European Parliament and of the Council of 2 December 2021 establishing rules on support for strategic plans to be drawn up by Member States under the common agricultural policy (CAP Strategic Plans) and financed by the European Agricultural Guarantee Fund (EAGF) and by the European Agricultural Fund for Rural Development (EAFRD) and repealing Regulations (EU) 1305/2013 and (EU) 1307/2013, OJ L 435, pp. 1-186, ELI: http://data.europa.eu/eli/reg/2021/2115/oj.
[19] In the IPCC methodology guidance, methods are provided for estimating emissions (and removals as appropriate) for each gas in mass units. A tier represents a level of methodological complexity. Usually three tiers are provided. Tier 1 is the basic method, Tier 2 is intermediate and Tier 3 is the most demanding in terms of complexity and data requirements. Tiers 2 and 3 are sometimes referred to as higher tier methods and are generally considered to be more accurate on the condition that adequate data are available to develop, evaluate and apply a higher tier method.
[20] European Commission, working paper 'Agriculture in the EU GHG Inventory, moving to a higher tier reporting', 11 March 2024.
[21] European Environment Agency, *Annual European Union greenhouse gas inventory 1990-2021 and inventory report 2023 – Submission to the UNFCCC Secretariat*, 2023, https://www.eea.europa.eu/ds_resolveuid/a9f7f010d2d348488e4345e7fdb3709e.
[22] Table 5.59 indicates the level of uncertainties of the different GHG from the different sources as declared by Member States. For example, N_2O in manure management has 68.4% uncertainty, N_2O in agricultural soils has 75.7%, CH_4 enteric fermentation has 11.9% and the EU average is 24.7%. For LULUCF, Table 6.32 indicates the level of uncertainties: CO_2 (cropland) has 188.4% uncertainty, CO_2 (grassland) has 110.0%, CO_2 (forest land) has 20.3% and the EU average is 39.9%.
[23] Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law'), OJ L 243, 9.7.2021, pp. 1-7, ELI: http://data.europa.eu/eli/reg/2021/1119/oj.
[24] See footnote 10.
[25] Belgium, Denmark, France, Germany, Ireland, Lithuania, Malta, Netherlands, Portugal, Slovenia – see note in Section 5.1.1 for details.
[26] See footnote 11.
[27] Climate Analytics and New Climate Institute, '*Climate Action tracker*', Climate Action Tracker website, 2024, https://climateactiontracker.org/countries/eu/policies-action/.

2. Objectives and method

The aim of this study is **to provide a rough estimate of the climate change mitigation potential of the CSPs over the 2023-2027 CAP programming period** based on the programming information included therein and the GHG emission reduction and enhanced carbon sequestration potential of the farming practices they support.

The study focuses on estimating the potential contribution of the CSPs to reducing CH_4 and N_2O emissions, as well as on increasing and safeguarding carbon stocks in soil and biomass.

To carry out this study, the European Evaluation Helpdesk for the CAP (hereinafter the Evaluation Helpdesk) developed a methodology that has been applied to 27 Member States (EU-27), corresponding to 28 CSPs [28]. The results are aggregated to provide an estimation at EU level. This report provides an estimation of the potential for climate change mitigation and carbon stock protection expected from the 28 CSPs in contributing to the EU's climate change objectives.

The calculations are primarily based on three key sources:

1. The information extracted from the **CSPs as approved by the European Commission in December 2022 for 19 CSPs** [29]**, in October 2023 for six CSPs** [30] **and July 2024 for the three remaining CSPs** [31]. These documents serve as the primary source of programming information and estimation of the output concerned (e.g. area or livestock, etc.).
2. The result of the study 'Mapping and analysis of CAP Strategic Plans – Assessment of joint efforts for 2023-2027' [32], in which the Evaluation Helpdesk and the JRC linked (hereinafter 'labelled') requirements of the standards of GAEC and CAP interventions at unit amount [33] level with farming practices, using the classification developed by the JRC [34].
3. **Mitigation coefficients** per farming practice, which are crucial for estimating the potential contribution of each intervention. These coefficients are derived from various sources, primarily the iMAP project [35] (Integrated Modelling platform for Agro-economic and resource Policy analysis), supplemented with additional data where necessary (see Box 2).

The study covers both mandatory requirements of the **GAECs** (Article 13 of CAP Strategic Plans Regulation (EU) 2021/2115) [36] and several **types of intervention** (voluntary commitments):

- **Schemes aimed at promoting climate, environmental and animal welfare objectives** (hereinafter referred to as eco-schemes), covered under Article 31 of CAP Strategic Plans Regulation (EU) 2021/2115,
- **Coupled income support (CIS) targeting protein crops,** including legumes and mixtures thereof, with legumes being predominant in the mixture, as specified in Article 33(c) of CAP Strategic Plans Regulation (EU) 2021/2115,
- **Environmental, climate-related, and other management commitments,** hereinafter referred to as ENVCLIM, detailed in Article 70 of CAP Strategic Plans Regulation (EU) 2021/2115,
- **Investments**, hereinafter referred to as INVEST, delineated in Article 73 of CAP Strategic Plans Regulation (EU) 2021/2115,
- **Sectoral interventions specifically targeting the fruit and vegetable sector,** covered under Articles 42 to 53 of CAP Strategic Plans Regulation (EU) 2021/2115. Sectoral interventions are investigated only in selected CSPs.

[28] There are two CSPs for Belgium, one for Flanders and one for Wallonia.

[29] Austria, Belgium-Flandres, Belgium-Wallonia, Czechia, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Netherlands, Poland, Portugal, Romania, Spain and Sweden.

[30] Croatia, Cyprus, Luxembourg, Malta, Slovenia and Slovakia.

[31] Bulgaria, Estonia and Lithuania.

[32] European Commission, Directorate-General for Agriculture and Rural Development, Chartier, O., Krüger, T., Folkeson Lillo, C. et al., *Mapping and analysis of CAP Strategic Plans – Assessment of joint efforts for 2023-2027*, Chartier, O.(editor), Folkeson Lillo, C.(editor), Publications Office of the European Union, 2023, https://data.europa.eu/doi/10.2762/71556.

[33] The unit amount is the amount of public funding planned to be granted for one unit of output (e.g. hectare or project). Each intervention foresees the use of at least one unit amount, while the use of different unit amounts is also common in the CSPs.

[34] Angileri, V., Guerrero, I. and Weiss, F., *A classification scheme based on farming practices*, Publications Office of the European Union, Luxembourg, 2024, doi:10.2760/33560, JRC133862.

[35] Guerrero, I., Bielza Diaz-Caneja, M., Angileri, V., Assouline, M., Bosco, S., Catarino, R., Chen, M., Koeble, R., Lindner, S., Makowski, D., Montero Castaño, A., Perez-Soba Aguilar, M., Schievano, A., Tamburini, G., Terres, J. and Rega, C., *Quantifying the Impact of Farming Practices on Environment and Climate*, Publications Office of the European Union, Luxembourg, 2024, doi:10.2760/20814, https://publications.jrc.ec.europa.eu/repository/handle/JRC137826 & Schievano, A., Perez-Soba Aguilar, M., Bosco, S., Montero Castaño, A., Catarino, R., Chen, M., Tamburini, G., Landoni, B., Mantegazza, O., Guerrero, I., Bielza Diaz-Caneja, M., Assouline, M., Koeble, R., Dentener, F., Van Der Velde, M., Rega, C., Furlan, A., Paracchini, M.L., Weiss, F., Angileri, V., Terres, J. and Makowski, D., '*iMAP Farming Practices dataset – An evidence library of the effects of Farming Practices on the environment and the climate*', European Commission, Joint Research Centre (JRC) [Dataset] (created 8 November 2023, last updated on 25 June 2024). doi: 10.2905/4e3c371a-be72-4ea0-aa0b-45f8cdda2064.

[36] CAP Strategic Plans Regulation (EU) 2021/2115 of the European Parliament and of the Council of 2 December 2021 establishing rules on support for strategic plans to be drawn up by Member States under the common agricultural policy (CAP Strategic Plans) and financed by the European Agricultural Guarantee Fund (EAGF) and by the European Agricultural Fund for Rural Development (EAFRD) and repealing Regulations (EU) 1305/2013 and (EU) 1307/2013, OJ L 435, pp. 1-186, ELI: http://data.europa.eu/eli/reg/2021/2115/oj.

The methodology employed is based on a series of assumptions and simplifications necessary at various stages of the analysis. It is crucial to consider these assumptions when interpreting the final estimates. A comprehensive outline of the general approach and underlying assumptions is provided in a separate document – the general methodology report [37]. **The methodology is based on the following key steps:**

1. At CSP level, identification of the CAP interventions and GAECs that have the potential to positively contribute to GHG emission reductions and enhance carbon removals or to protect existing carbon sinks.
2. Allocating relevant farming practices to each CAP intervention and GAEC (hereinafter 'labelling' interventions or GAECs), using the farming practices classification developed by the JRC [38] (see Box 2).
3. Estimation of the area (in terms of hectares [39]) covered by a farming practice.
4. Assignment of mitigation or protection coefficients to the farming practices (see Box 2).
5. Estimation of the mitigation or protection potential of each CAP intervention and GAEC at CSP level by multiplying the estimated area (or other unit of measurement) of each farming practice by its coefficient value before aggregating them at the intervention/GAEC and then CSP level.
6. Aggregation of estimates from the 28 CSPs.

Box 2. Farming practices classification scheme and coefficient values

Farming practices classification scheme [40]

To enable the assessment of similar interventions across different Member States and different CAP areas, the JRC drew up a classification of farming practices. The classification is built so that the classes reflect the different levels of detail with which requirements are described in the interventions of the CSPs. Therefore, the classification is divided into tiers, where the farming practices are described with more detail from Tier 1 to Tiers 2 and 3. To guide the user through the classification, these farming practices are aggregated into sections. In total, there are 18 sections, 45 Tier 1 classes, 164 Tier 2 classes and 157 Tier 3 classes. This classification is utilised to provide rough estimates.

Mitigation versus protection

For this study, the distinction between two following groups of farming practices is particularly important:

- **Mitigation**: practices actively contributing to reducing GHG emissions and/or enhancing carbon removal from the atmosphere.
- **Protection of carbon sinks**: practices safeguarding existing carbon sinks and preserving carbon stocks in soil or biomass.

Assigning coefficient values to farming practices

Farming practices are assigned coefficient values representing their estimated contribution in terms of reducing GHG emissions, enhancing carbon removals or protecting carbon stocks in soil or biomass, expressed in kilogrammes of CO_2e per unit (hectares or other unit of measurement) per year, in comparison to a reference conventional farming practice.

Original coefficients are extracted from the JRC work for the iMAP project [41] and from other sources [42].

These coefficients are predominantly drawn up at the European or global level. Fine-tuning at national level (or even lower levels) would greatly improve the accuracy of the estimates. Also, the effects captured in the coefficient values pertain to the farm level and do not include indirect land-use change effects. Finally, there is also no consideration of the combined contribution of different practices in the same area.

The study has some gaps, as for a few farming practices, no data are available to determine a coefficient. They are listed in Annex 2 – Farming practices without data. However, the overall coverage in terms of coefficient is considered adequate because the main practices with a potential to reduce GHG emissions and/or enhance carbon removal are associated with a coefficient value.

The list of farming practices used for the estimates, their coefficient values and categories are available in Annex 1 – Farming practice emissions and removal coefficients. Other specificities relating to the coefficients are reported in the General Methodology deliverable [43].

Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025)

[37] The detailed 'general methodology' underlying this study is described in a separate report. This report is available upon request and can be obtained by sending an email to evaluation@eucapnetwork.eu.
[38] See footnote 34.
[39] Other units of measurement can also be used, such as livestock units or megawatts.
[40] See footnote 34.
[41] See footnote 35.
[42] Directorate-General for Agriculture and Rural Development, Pražan, J., Nanni, S., Redman, M., Vedrenne, M. et al., *Evaluation study of the impact of the CAP on climate change and greenhouse gas emissions – Final report*, Publications Office, 2019, https://data.europa.eu/doi/10.2762/54044 and Directorate-General for Climate Action, Wiltshire, J., Keesje, A. and Gill, D., *Guidance to Member States in improving the contribution of land-use, forestry and agriculture to enhance climate, energy and environment ambition*, Publications Office of the European Union, 2023, https://data.europa.eu/doi/10.2834/19417.
[43] See footnote 38.

These estimates are based on the interventions and GAECs planned in the CSPs as approved by the Commission. The areas estimated per farming practice are derived from the planned outputs, result indicators and other data included in the CSPs on expected uptake of interventions by farmers. Where the potential area under a particular practice is not specified in the CSP, different approaches were used to estimate an area per farming practice. The different options are explained in the methodological report (see the general methodology report for further detail) [44].

Estimating the potential positive contribution of CSPs

The calculation provides rough estimates of the potential contribution of the CAP instruments listed above. It does not strictly compare the effect expected from the CSPs to a reference scenario (for instance, previous CAP or hypothetical scenario without CAP). Moreover, GAECs and CAP interventions are treated differently.

For CAP interventions, the estimated potential contribution encompasses all the areas where supported farming practices are expected to be implemented through the different types of intervention covered. The areas on which the given practices would apply, even without the CAP support, or that were already supported in the previous CAP, are included in the calculation. Therefore, the final estimate represents the potential contribution of all the areas expected to receive CSP support compared to a hypothetical situation where 'standard' farming practices would be implemented instead. With this approach, the estimated potential contribution of the interventions is the maximum potential the CSP could reach, considering also farming practices already implemented in the previous period or without any CAP support (deadweight effect). The information to focus on the additional areas is not accessible at this stage, which explains the approach chosen for CAP interventions.

For GAECs, a different approach is adopted compared to the one used for the CAP interventions. **In this case, the study aims to estimate only the potential contribution of the additional areas where farming practices will be implemented to comply with the standards in the new programming period, compared to the previous programming period.** With this approach, the potential contribution estimated for GAECs might be underestimated compared to the approach used for CAP interventions.

In addition, the approach assumes that GAEC standards provide the basis for the calculation and that interventions are carried out on top of and beyond GAEC standards: eco-schemes followed by ENVCLIM and finally INVEST. This means that the order of priority above is respected when a risk of overlap is identified.

Yearly potential, hypothetically delivered each year of the programming period

The potential contribution of the CSPs is estimated on a yearly basis (the total planned output indicated in the CSPs for the 2023-2027 programming period is divided by five to calculate annual averages).

This entails that the CSPs' potential contribution to emissions reduction and removal objectives could be delivered every year from 2023 to 2027, making the estimated potential contribution quite significant. However, whether this potential will be fully realised and the magnitude of the contribution, will depend on the final uptake of the measures by farmers and whether these practices were already financed under the previous CAP, or would be implemented without CAP support (deadweight effect), which is not possible to assess at this stage.

Acknowledging the preliminary nature of these estimates is crucial, as they rely on programmed data (what is planned in the CSP and not on the actual uptake), as well as rough estimates of expected areas covered by farming practices, and average emission and removal coefficients for farming practices. Consequently, results should be interpreted with caution and cannot be considered an assessment of the effect of the CSPs compared to the situation before 2023. Further improvement in the approach and data would bring more accurate results, particularly with coefficient values more specific to national or local conditions and better estimations of the areas under each farming practice (using data on the actual uptake of the various interventions).

The following chapters present the estimated results separated between GHG emissions and removals (Chapter 3) and protection of carbon sinks (Chapter 4). Chapter 5 considers the CSPs' potential contribution to climate change mitigation estimated within the context of the EU climate policy framework. The final chapter outlines recommendations to improve the estimates.

[44] See footnote 38.

3. Estimated mitigation potential contribution

3.1. Estimated mitigation potential contribution at EU level

This chapter focuses on the total potential contribution estimated at the level of the 28 CSPs. Results are detailed per farming practice (as per the JRC classification scheme), per GAEC and type of intervention, and according to the UNFCCC Common Reporting Format (CRF) categories [45].

In Chapter 3.2, the estimates are presented per CSP.

3.1.1. Estimated mitigation potential per farming practice at EU level

The analysis of the 28 CSPs indicates an estimated potential positive contribution to GHG emission reduction and enhanced removal of 35.0 Mt CO_2e annually across the 27 Member States. Over the five-year implementation period, this amounts to a cumulative total of 175.4 Mt CO_2e.

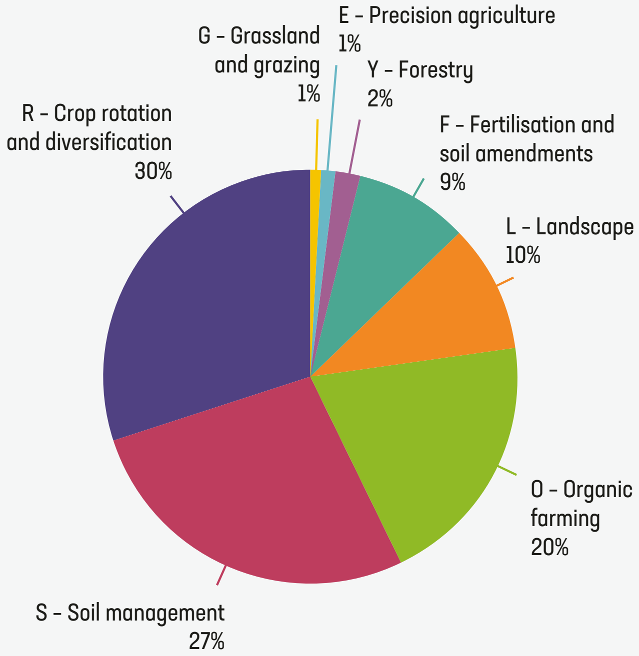
This positive contribution is only a potential figure and comes at this stage with a range of uncertainties due to the numerous assumptions made. Figure 1 presents the breakdown of the GHG emission reduction and enhanced removal potential per category of farming practice [46]. Conversion to organic farming (O – Organic farming), the implementation of rotation or diversification of crops (R – Crop rotation and diversification), and the expansion of cover crops (S – Soil management) as required through GAECs or supported by the voluntary schemes account for over three quarters of the estimated mitigation potential.

Figure 1. Distribution of the total estimated mitigation potential, aggregated by categories of farming practices (according to the JRC farming practices classification) (%)

Aggregation is done by summing the estimated mitigation potential per category of farming practice for each CSP. The estimated mitigation potential per farming practice is calculated as the sum of the areas (or heads) covered by each practice multiplied by the associated mitigation coefficient.

Categories M (manure management), A (animals) and B (bioeconomy), energy efficiency and production do not appear on the graph because they each contribute less than 0.5% of the total.

Example on how to read the graph: 30% of the estimated total reduction in emissions and enhanced removals (10.5 Mt) is due to the implementation, in the 28 CSPs, of farming practices linked to the JRC classification category R (Crop rotation and diversification).



Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other source

[45] See footnote 3.
[46] Tier 1 of the JRC classification scheme; see footnote 3.

Figure 2. Estimated mitigation potential per farming practice, all types of intervention and requirements (GAECs) included, in the 28 CSPs (Mt CO_2e/year)

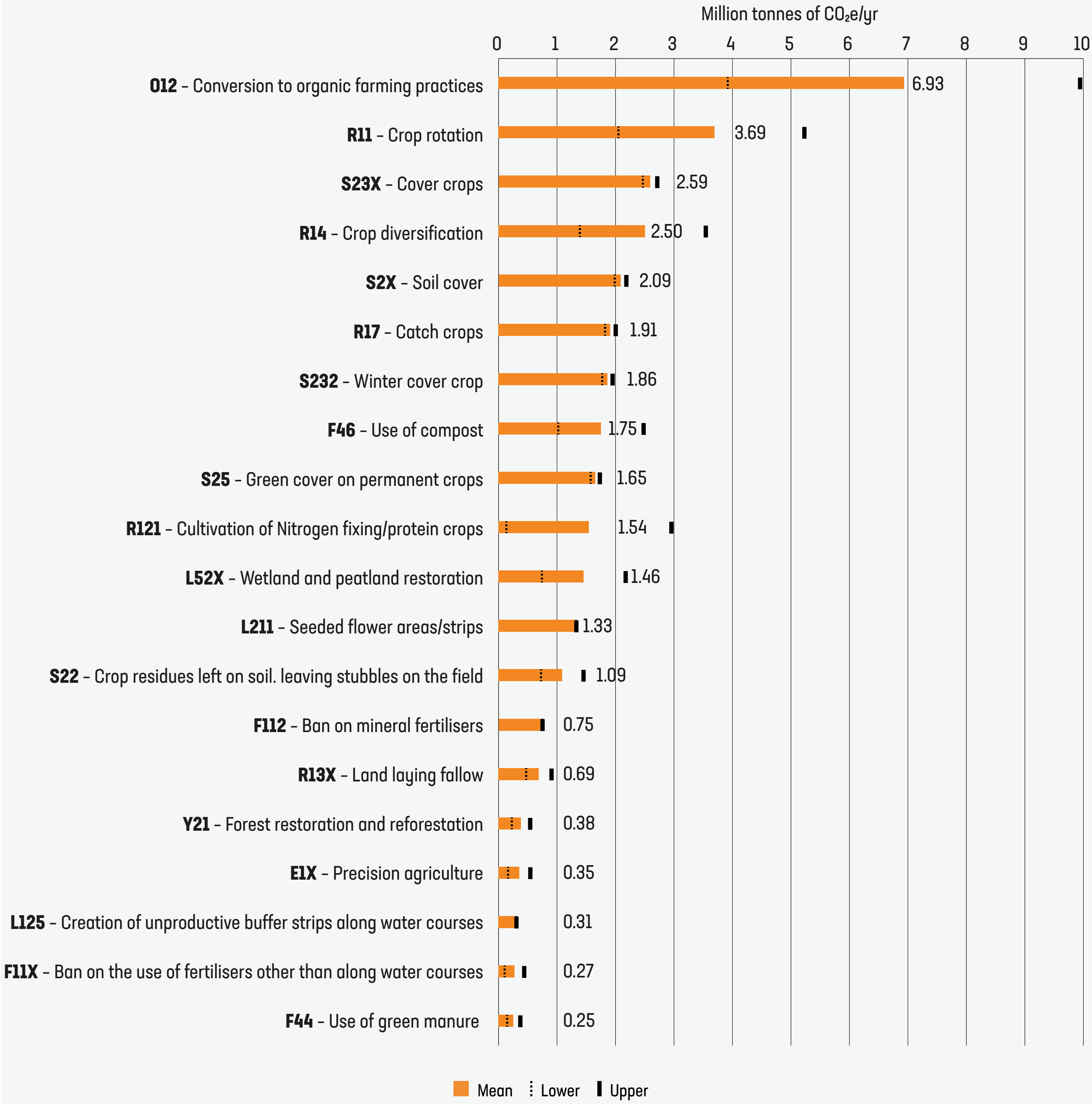
The 20 farming practices listed in this figure are estimated to contribute to 95% of the total estimated mitigation potential (i.e. 35.0 Mt CO_2e annually).

Aggregation is done by summing each CSP's estimated mitigation potential per farming practice. The estimated mitigation potential per farming practice is the sum of the areas (or heads) covered by each practice multiplied by the mitigation coefficient mean value.

The markers in black represent the upper and lower bounds indicating the 95% confidence interval of the mitigation coefficient per practice (the bigger the interval, the less accurate the coefficient value of the farming practice concerned). When markers overlap, it means that the confidence interval is not available.

Annex 1 – Farming practice emissions and removal coefficients details the emission and removal coefficients of the farming practices.

Example on how to read the graph: 'Conversion to organic farming practices' (O12) is estimated to potentially reduce GHG emissions and increase carbon sequestration by an average 6.9 Mt CO_2e annually, compared to the emissions and removals expected if the areas were cultivated using conventional practices.



Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other source

Twenty farming practices make up the majority of the estimated mitigation potential

Figure 2 provides a detailed breakdown of the 20 farming practices contributing the most to this estimated mitigation potential (out of 48 practices identified in the 28 CSPs that were associated with a coefficient value, i.e. that are estimated to contribute to the effect of the CSPs).

In Annex 4 - Estimated mitigation potential and estimated areas per farming practice, the estimated mitigation potential and corresponding areas for each farming practice are presented in a combined graph, illustrating the contribution of each farming practice to the total mitigation potential. This highlights how certain farming practices, although not widely implemented, significantly influence the overall mitigation estimate. Conversely, some widely adopted practices have a relatively smaller estimated potential contribution. These variations stem directly from the coefficient value assigned to each farming practice, detailed in Annex 1 - Farming practice emissions and removal coefficients.

Among the practices, O12 (conversion to organic farming) stands out as the primary contributor, accounting for 20% of the total estimated mitigation potential (6.9 Mt out of 35.0 Mt).

The group of practices related to crop rotation and diversification is expected to significantly contribute to the total estimated, cumulating 30% of the total estimated mitigation potential (10.5 Mt out of 35.0 Mt). These include practices such as:

- R11 - Crop rotation (11%; 3.7 Mt out of 35.0 Mt)
- R14 - Crop diversification (7%; 2.7 Mt out of 35.0 Mt)
- R17 - Catch crops (5%; 1.9 Mt out of 35.0 Mt)
- R121 - Cultivation of nitrogen fixing/protein crops (4%; 1.5 Mt out of 35.0 Mt)
- R13X - Land laying fallow (2%; 0.7 Mt out of 35.0 Mt).

Following closely, are practices related to soil management, contributing 27% of the estimated potential contribution (9.6 Mt out of 35.0 Mt). This group includes:

- S23X - Cover crops (7%; 2.6 Mt out of 35.0 Mt)
- S2X - Soil cover (6%; 2.1 Mt out of 35.0 Mt)
- S232 - Winter cover crop (5%; 1.9 Mt out of 35.0 Mt)
- S25 - Green cover on permanent crops (5%; 1.7 Mt out of 35.0 Mt)
- S22 - Crop residues left on soil, leaving stubbles on the field (3%; 1.1 Mt out of 35.0 Mt).

Fertilisation and soil amendments-related practices contribute 12% to the total estimated potential contribution (4.4 Mt out of 35.0 Mt), including:

- F46 - Use of compost (5%; 1.8 Mt out of 35.0 Mt)
- F112 - Ban on mineral fertilisers (2%; 0.8 Mt out of 35.0 Mt)
- F11X - Ban on fertilisation on areas other than along watercourses (1%; 0.3 Mt out of 35.0 Mt)
- F44 - Use of green manure (1%; 0.3 Mt out of 35.0 Mt).

The group of practices related to the protection of landscape features contribute 10% to the total estimated potential mitigation contribution (3.4 Mt out of 35.0 Mt). This includes practices such as:

- L52X - Wetland and peatland restoration (4%; 1.5 Mt out of 35.0 Mt)
- L211 - Seeded flower areas/strips (4%; 1.3 Mt out of 35.0 Mt)
- L125 - Creation of unproductive buffer strips along watercourses (1%; 0.3 Mt out of 35.0 Mt).

The other practices among the 20 that make up the majority of the estimated mitigation potential are:

- Y21 - Forest restoration and reforestation (1%; 0.4 Mt out of 35.0 Mt)
- E1X - Precision agriculture (1%; 0.4 Mt out of 35.0 Mt).

No mitigation potential is estimated for the animal-related practices

The potential positive contribution of practices in sections A (animals) and M (manure management) is estimated to be negligible. This is due to a limited number of animal-related farming practices associated with a coefficient value and a limited number of interventions focusing on these farming practices. The methodology does not assess other policies or measures that Member States might implement to address GHG emissions in the livestock sector.

- Out of 41 animal-related practices in the JRC classification (sector A (animals) in the classification), only two have a proven mitigation potential (A21 (animal trait selection for GHG emission) and A23 (animal trait selection for longer lifespan); see Annex 1 - Farming practice emissions and removal coefficients). For eight of them, the data are not sufficient to determine their mitigation potential (see Annex 2 - Farming practices without data).
- A21 (animal trait selection for GHG emission) is only labelled in Ireland with an estimated potential contribution of 11 505 tonnes of CO_2e per year (reduction of non-CO_2 emissions). A23 (animal trait selection for longer lifespan) is only targeted in the German CSP.
- Section M (manure management) includes four practices with a mitigation potential effect (i.e. M114 (manure acidification during storage), M122 (composting with forced aeration), M12X (composting) and M141 (solid-liquid separation)). However, these practices are labelled only in the CSPs of Austria, Belgium-Flanders, Latvia and Malta, with an estimated potential contribution of only 5 907 tonnes of CO_2e per year.
- Additionally, some manure-related practices are classified under section F (fertilisation and soil amendments).

Box 3. Confidence in the coverage of farming practice classification and coefficient values

It is important to acknowledge some methodological limitations to assess the estimated results in this study.

1. Most farming practice coefficients are provided with a mean value, with lower and upper bounds, indicating the 95% confidence interval of the given coefficient. These intervals are indicated by black markers in the figures, providing an indication of the accuracy of the estimated contribution linked to the coefficient associated with the farming practice. It is important to note that these intervals do not account for other sources of uncertainty in the estimated results, particularly uncertainty at the time of estimating the areas associated with the farming practices to estimate the potential contribution. This interval can be significant for farming practices such as F46 (use of compost), O12 (conversion to organic farming practices), R11 (crop rotation), and R14 (crop diversification), according to the literature consulted in the iMAP project [47]. This affects the precision of the estimated results.
2. As mentioned previously, the effects captured in the coefficients do not include indirect land-use change effects. These effects can be significant in certain cases, particularly the coefficient value for the conversion to organic farming practices (O12) could be lower if these effects were considered.
3. Finally, the adopted approach is conservative. As mentioned in Box 2, the study includes farming practices that are expected to have a mitigation or protection potential, but for which no data are available to determine a coefficient, so no mitigation contribution has been considered for those practices. See Annex 2 – Farming practices without data.

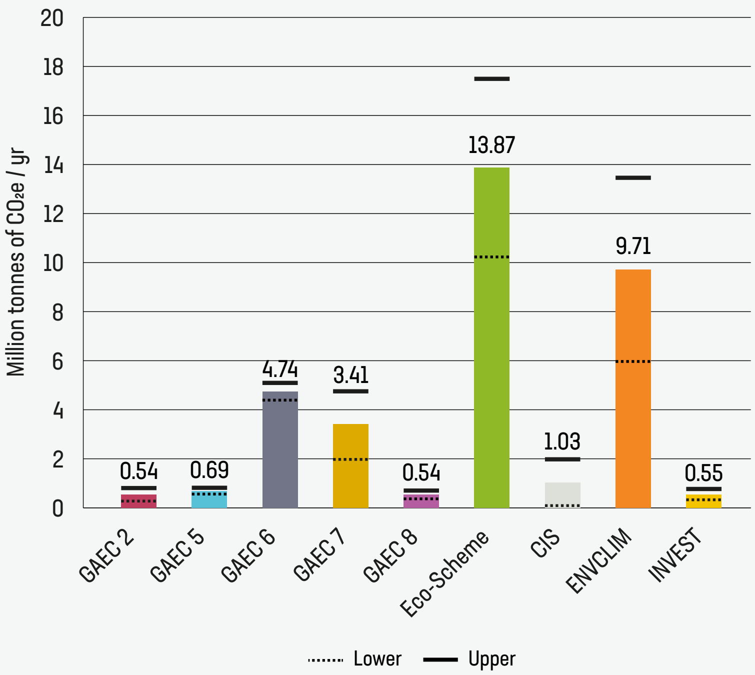
Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025)

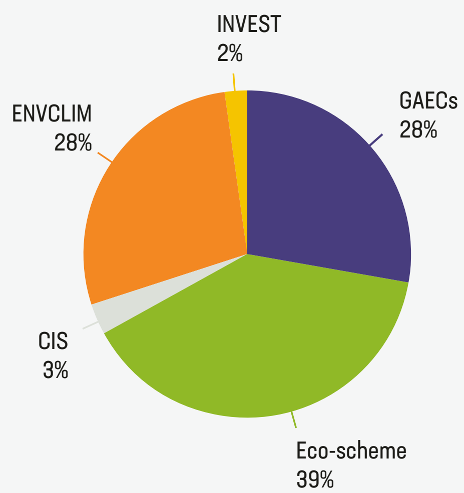
3.1.2. Estimated mitigation potential per GAEC and type of intervention at EU level

Figure 3 reports the distribution of the GHG mitigation and enhanced carbon removal estimated potential per GAEC and type of intervention.

Figure 3. Estimated mitigation potential per GAEC and type of intervention (Mt CO_2e/yr and %)

Examples on how to read the graph: (graph on the left) eco-schemes' estimated potential contribution at the level of the 28 CSPs amounts to 13.87 Mt CO_2e of avoided emissions and/or enhanced sequestration compared to the emission/removal level that would occur should all the areas concerned be cultivated with 'standard' farming practices. (graph on the right) 39% of the total estimated GHG emissions mitigation and enhanced removal potential is associated with the implementation of eco-schemes in the 28 CSPs.





Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other sources

[47] It is even higher for the coefficient values of R121 (cultivation of nitrogen fixing/protein crops), L211 (seeded flower areas/strips) and F112 (ban on mineral fertilisers). See details in the general methodology deliverable (see footnote 38).

It is important to consider the difference in approach between interventions and GAECs when reading these results. As explained in Section 2.1.1 of this report, for CAP interventions, the estimated potential contribution encompasses all the areas where farming supported practices are expected to be implemented through the different types of intervention, whereas, for GAECs, the study aims to estimate only the potential contribution of the additional areas where farming practices will be implemented to comply with the standards in the new programming period, compared to the previous programming period. With this approach, the potential contribution estimated for GAECs might be underestimated.

Eco-schemes are the intervention that is expected to contribute the most: 39% of the total estimated mitigation potential.

There is considerable diversity of eco-schemes across the 28 CSP, but 77% of the estimated mitigation potential from them is associated with the following farming practices: R14 (crop diversification) (16%), S2X (soil cover) (11%), F46 (use of compost) (10%), S232 (winter cover crop) (10%), O12 (conversion to organic farming practices) (8%), S25 (green cover on permanent crops) (8%), R17 (catch crops) (7%) and L211 (seeded flower areas/strips) (7%).

The ENVCLIM intervention and compliance with GAEC are each expected to contribute 28% of the total estimated mitigation potential.

Under the ENVCLIM type of intervention, O12 (conversion to organic farming practices) is estimated to be, by far, the main contributing farming practice, accounting for 60% of the estimated potential contribution, followed by L52X (wetland and peatland restoration) (9%), F112 (ban on mineral fertilisers) (5%) and L211 (seeded flower areas/strips) (4%).

More details on the distribution of the estimated potential contribution of the eco-schemes and the ENVCLIM type of intervention are available in Annex 3 - Estimated mitigation potential contribution of eco-schemes and ENVCLIM per CSP and farming practice.

Compliance with GAECs has an estimated potential contribution that varies depending on the GAEC.

GAEC 6 (soil cover) and GAEC 7 (crop rotation on arable land) are expected to potentially contribute 14% (5.1 Mt out of 35.0 Mt) and 10% respectively (4.7 Mt out of 35.0 Mt).

The other GAECs are expected to contribute less (5% of the 35.0 Mt CO_2e).

- The estimation of the potential contribution of GAEC 2 (protection of wetlands and peatlands) is challenging due to the lack of information in the CSPs on the areas potentially concerned and due to the limited number of CSPs, including specific requirements in 2023. Its potential contribution, therefore, is clearly underestimated in this study. See Box 4 for further information.
- GAEC 5 (tillage management) is estimated to have a very small mitigation potential contribution at the 28 CSP level. Estimating the potential contribution of GAEC 5 posed challenges due to considerable overlaps in farming practices between GAEC 5 and GAEC 6. This overlap complicates the clear delineation of areas addressed by each standard. As a result, in certain regions - such as Belgium-Flanders, Belgium-Wallonia, Latvia, Lithuania, Sweden, Slovenia and Slovakia – the potential contribution of GAEC 5 is not estimated separately but is instead considered as part of the impacts attributed to GAEC 6.
- The potential mitigation contribution estimated for GAEC 8 (non-productive areas) and features is also low. The potential contribution of this GAEC is only linked to the farming practice R13X (land laying fallow). See the general methodology deliverable for further details [48]. It is important to note that part of the potential contribution of the GAEC is also reported under the protection of carbon sinks (in Chapter 4). See Box 5 for further information.
- GAEC 1 (maintenance of permanent grassland) does not appear in the results for mitigation. Due to its nature, there is no estimated potential for the reduction of GHG emissions or enhanced removals of carbon associated with the protection of existing grasslands. The potential contribution of this GAEC is accounted for under the protection of carbon sinks (in Chapter 4).

[48] See footnote 38.

Box 4. Focus on peatlands and wetlands restoration and maintenance

Restoring peatlands, i.e. rewetting drained peatlands, is very effective in terms of increasing carbon sequestration compared to drained organic soils. The additional sequestration capacity of a functioning peat forming soil compared to drained peatland is estimated above 2 tonnes of CO_2e per hectare per year (farming practices L522 (peatland restoration) and L52X (wetlands and peatland restoration)). The second most effective practice regarding organic soils, according to the data available for the study, is to maintain them in wet conditions or implement paludiculture. This is protecting existing carbon sinks (farming practices L512 (peatland maintenance and conservation) and L51X (wetlands and peatland maintenance and conservation)).

GAEC 2 – Protection of wetlands and peatlands

GAEC 2 aims to protect wetlands and peatlands. The standards set in the CSP provide for different types of options, which are associated with both mitigation and protection of carbon sinks. Yet the estimation of the potential contribution of GAEC 2 is challenging and the estimated results presented in this report are overall underrated.

- Potential contribution of GAEC 2 could only be estimated for Estonia, Latvia, Lithuania and Sweden, as their CSPs provide precise information on the requirements and data to estimate the areas potentially covered are available [49].
- Mitigation potential is anticipated for several other CSPs (Austria, Belgium-Flanders, Belgium-Wallonia, Bulgaria, Finland, Italy, Poland, Portugal, Romania and Slovenia), but data gaps hinder an accurate estimation.
- In particular, the potential contribution of the ban on peat extraction is not estimated here. Peat extraction can be quite significant in northern countries. The CRF data for Finland's 2021 emissions reported in 2023 indicate that the emissions from peat extraction are estimated to represent, in 2021, 1.8 Mt CO_2e [50]. Cutting all or even part of these emissions would make a very significant difference in the estimations for Finland and even at the level of the 28 CSPs. This is not done due to lack of information on the extent to which the implementation of GAEC 2 could reduce the 1.8 Mt mentioned. The other CSPs providing restrictions on peat extraction are those of Austria, Belgium-Flanders, Portugal, Slovenia, Spain and Romania, but the estimated potential contribution in these countries is expected to be much less significant.
- No expected potential contribution is estimated for Denmark, Germany, Greece or Luxembourg due to CSP standards that do not include practices with a potential mitigation effect and in Cyprus and Malta as their peatland areas are negligible.
- No conclusion could be drawn for Croatia, Czechia, France, Hungary, Ireland, Netherlands, Slovakia or Spain.

Voluntary schemes

The screening of the CSPs also led to identify a series of ENVCLIM interventions supporting peatland restoration in Germany, Denmark, Estonia, Hungary, Ireland, Latvia, Netherlands, Finland, Italy and Poland, as well as eco-scheme interventions in Lithuania and INVEST interventions in Belgium-Wallonia.

Potential contributions could be estimated for part of these interventions in Germany, Estonia, Hungary, Ireland, Latvia, Lithuania, Finland and the Netherlands. In other cases, the lack of data to estimate the area potentially covered or the lack of coefficient values hinders the estimation.

Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025)

Other types of intervention, namely CIS and INVEST, have a marginal expected potential contribution.

It should be noted that INVEST interventions, particularly non-productive investments, may work in synergy with ENVCLIM interventions. Thus, part of the potential mitigation linked to ENVCLIM interventions may rely on associated INVEST interventions. Additionally, the estimation of the potential contribution of INVEST is challenging and possibly underestimated in this study. This difficulty stems from the fact that the unit of measurement of the output indicator associated with INVEST interventions is typically 'number of operations', making it difficult to associate the intervention with specific farming practices and to estimate the areas where these practices would be implemented.

Also, the estimated potential contribution of CIS for protein crops, although not significant at the EU level, appears to be significant in certain Member States.

[49] Relevant UNFCCC CRF data for 2021 emissions reported in 2023 is available (Cat. 4.II.B. Cropland-Drained organic soil and 4.II.C. Grassland-Drained organic soil).
[50] United Nations climate change, Finland National Inventory Submissions 2023-2021, Table 4.D 1.1. Peat extraction remaining peat extraction.

Box 5. Implication of changes in the CSP regulation on the estimated potential contributions

In May 2024, Regulation (EU) 2024/1468 [37] amended the CAP Strategic Plan Regulation (EU) 2021/2115 [38], leading to significant changes to the standards for GAEC 7 (crop rotation) and GAEC 8 (non-productive areas and features). The regulatory changes removed stipulations on non-productive areas from the GAEC 8 standard [39] and included the possibility of fulfilling GAEC 7 through crop diversification instead of crop rotation.

Within the scope of this study, the potential contribution of GAEC 8 was assessed according to the standards delineated in the CSP adopted in December 2022. The findings indicate that across the 28 CSPs analysed, the implementation of GAEC 8 could potentially contribute to increase carbon removals by approximately half a million tonnes of CO_2e annually (ranging from 0.4 to 0.7 Mt), representing 2% of the total estimated mitigation potential. This estimated potential contribution is due to the anticipated potential increase in areas with land lying fallow.

Additionally, GAEC 8 is expected to potentially contribute to protecting existing carbon sinks, predominantly stored in hedgerows and trees, by an estimated one Mt CO_2e annually. This aspect is not directly affected by the regulatory amendments as GAEC 8 still requires maintenance of existing features.

For GAEC 7, within the scope of the study, the coefficient value of the farming practice associated with crop diversification (farming practice R14 (crop diversification)) is approximated by the value of the coefficient for crop rotation (farming practice R11 (crop rotation)). Therefore, the change in standards is not expected to affect the estimated potential contribution of GAEC 7, provided no other modifications are included in the CSP.

Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025)

3.1.3. Estimated mitigation potential aggregated according to UNFCCC CRF sectors at EU level

As a party to the UNFCCC, the EU reports annually on GHG emissions and removals within the area covered by its Member States. To contextualise the estimated potential contribution of CSPs in relation to current emissions and removals in the 27 Member States, the estimates are aggregated according to the CRF categories employed by Member States under the EU Governance Regulation (EU) 2018/1999 [54], to report to the UNFCCC.

For that, each farming practice is associated with one or more CRF categories. Although the correspondence is not always straightforward because the methodology employed to estimate the mitigation potential contribution of the CSP deviates from the IPCC inventory methodologies, this step makes it possible to contextualise the estimated potential contribution of the CSPs. The correspondence between the farming practices classification and CRF categories is provided in Annex 1 – Farming practice emissions and removal coefficients. The average emissions and removals reported for the 2018-2022 period [55], serve as the basis for comparison with rough estimates calculated in this report.

[51] Regulation (EU) 2024/1468 of the European Parliament and of the Council of 14 May 2024 amending Regulations (EU) 2021/2115 and (EU) 2021/2116 as regards good agricultural and environmental condition standards, schemes for climate, environment and animal welfare, amendment of the CAP Strategic Plans, review of the CAP Strategic Plans and exemptions from controls and penalties, OJ L, 2024/1468, ELI: http://data.europa.eu/eli/reg/2024/1468/oj.

[52] See footnote 36.

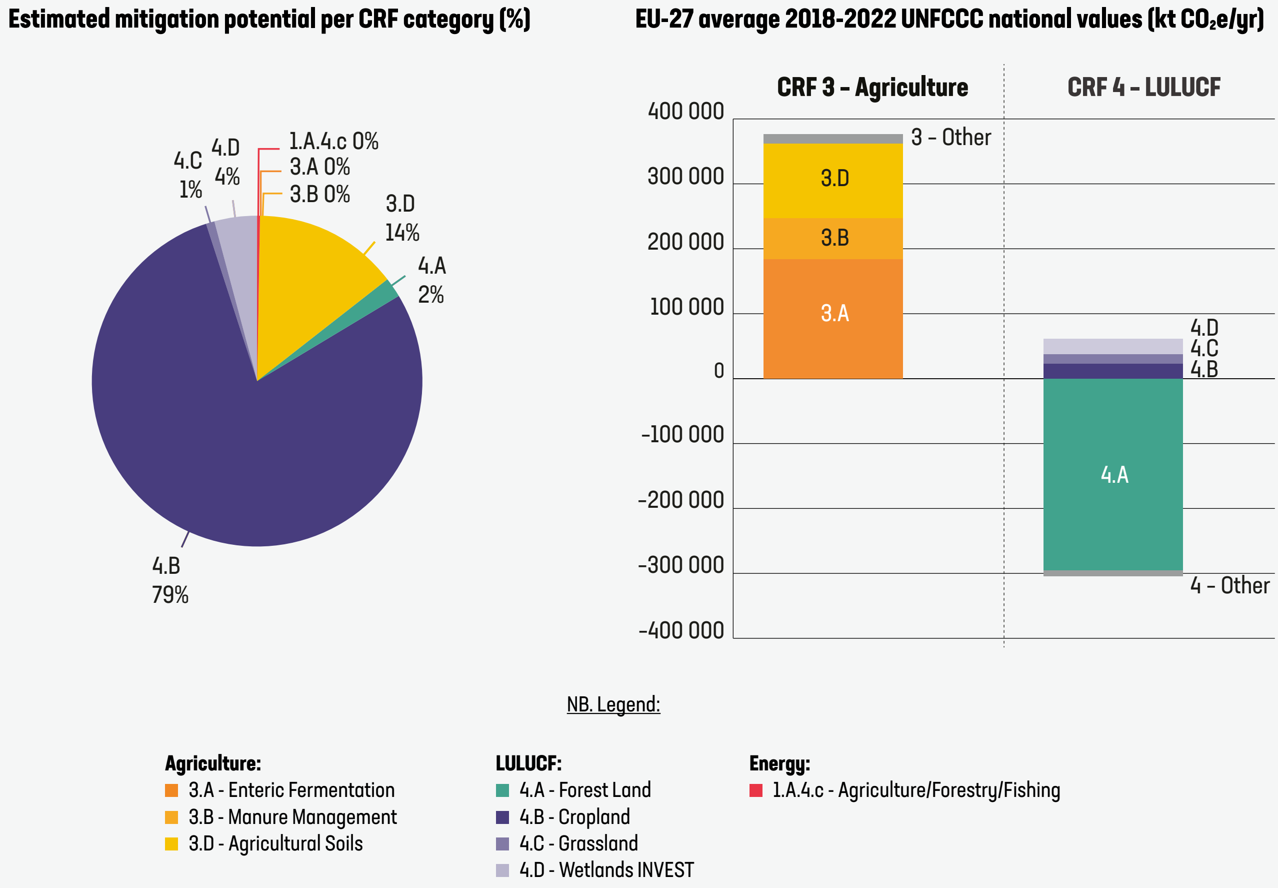
[53] It is suggested in Regulation (EU) 2024/1468 that Member States instead provide support by means of eco-schemes covering practices for the maintenance of non-productive areas, such as land lying fallow, and for the establishment of new landscape features, on arable land.

[54] See footnote 1.

[55] See footnote 3.

Figure 4. Estimated mitigation potential per CRF category (left) and EU-27 average 2018-2022 UNFCCC national values (right)

Examples on how to read the graph: (graph on the left) the estimated mitigation potential of the CSPs, associated with CRF category 4.B (LULUCF-Cropland) accounts for 79% of the total estimated potential contribution of the CSPs. (graph on the right). Emissions reported to the UNFCCC under CRF category 4.B currently represent a small source of emissions in the EU LULUCF sink.



Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other sources, EEA

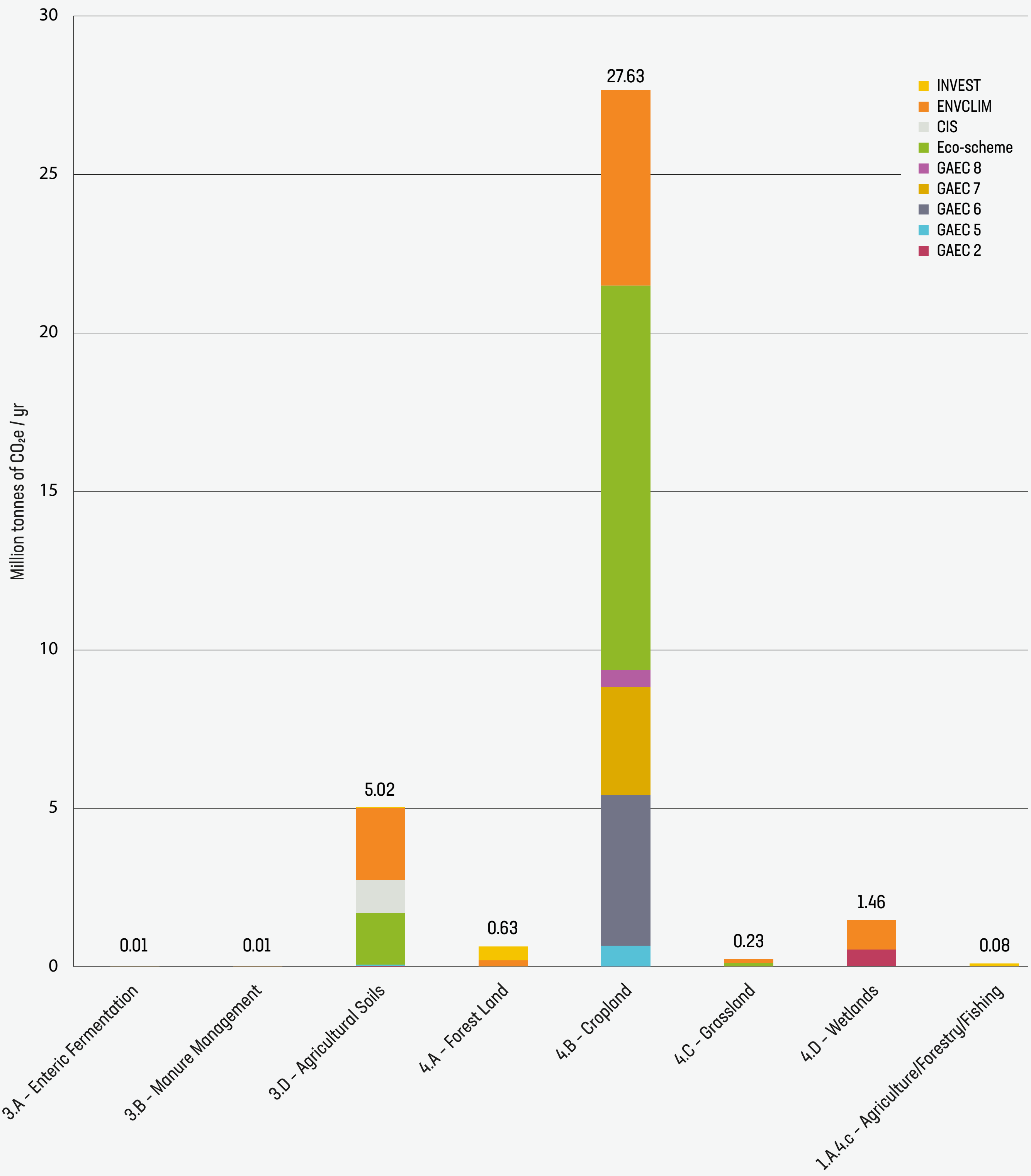
Figure 4 compares the distribution per CRF category of the estimated potential contribution of the CSPs (graph on the left) to the distribution of the 2018-2022 emission values reported in the national GHG inventory (graph on the right):

- The CRF categories 3.A (enteric fermentation) and 3.B (manure management) contribute to 66% of the emissions from agriculture reported at national level (graph on the right), while the potential contribution of CSPs to reduce emissions from these categories is estimated to be negligible (17 kt CO_2e annually). This limited potential is due to two primary reasons: very few interventions specifically target these types of practices and a lack of available data to establish coefficient values for several farming practices related to these categories.
- Conversely, the storage of carbon in cropland soils plays a significant role in the CSPs' estimated potential contribution. More than three-quarters (79%) of the estimated annual mitigation potential is associated with the CRF category 4.B (cropland), which currently represents a small source of emissions in the EU LULUCF sink.

Figure 5 and Table 1 provide more detailed information on the estimated mitigation potential of the 28 CSP per CRF category.

Figure 5. Estimated mitigation potential, per CRF category, type of intervention and GAEC (Mt CO_2e/yr)

Example on how to read the graph: mainly three types of intervention contribute to the estimated mitigation potential associated with the CRF category 3.D (agricultural soils) (5.02 Mt in total). In this CRF category, the ENVCLIM intervention is responsible for 2.3 Mt CO_2e, while CIS for 1.0 Mt and the eco-scheme for 1.6 Mt.



Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other

Table 1. Estimated potential mitigation contribution in the 28 CSPs, per CRF category (kt CO_2e/year and for five years) and national emissions and removals reported to the UNFCCC

Category 1.A.4.c covers emissions from energy consumption in agriculture/forestry/fishing. Emissions from energy consumption are only available in aggregate for energy consumption in agriculture, forestry and fisheries. Category 3 refers to GHG emissions from agricultural activities. Category 4 pertains to changes in carbon stocks, including emissions and removals, from LULUCF.

The second column displays the estimated annual mitigation potential from the 28 CSPs (data consolidated from this study) aggregated per CRF category, while the last column presents the values cumulated over a five-year period. In these two columns, the estimated mitigation potential contributions indicated with positive values in all categories represent a mitigating potential effect (enhanced carbon removals or decrease in GHG emissions).

The fourth column indicates the combined 2018-2022 average UNFCCC national values [56] from the 27 Member States, per CRF category. In this column, positive values represent net emissions, while negative values indicate a net removal effect.

The fifth column illustrates the share of the estimated mitigation potential contribution over the 2018-2022 UNFCCC national values.

	CSPs estimated annual mitigation potential (kt CO_2e/yr)	Main effect	2018-2022 UNFCCC national values (kt CO_2e/yr)	Share (CSPs estimate/ annual emissions)	CSPs cumulated 5-year estimated potential (kt CO_2e)
1.A.4.c - Agriculture/Forestry/Fishing	84	Renewable energy	78 119	0%	419
3.A - Enteric Fermentation	12	Reduction of non-CO_2 emissions	183 473	0%	58
3.B - Manure Management	6		63 557	0%	30
3.D - Agricultural Soils	5 022		114 802	4%	25 109
Total CAP related (CRF 3.A + 3.B + 3.D)	5 039		361 832	1%	25 196
Total non-ETS agricultural emissions (CRF 3)	5 039		376 733	1%	25 196
4.A - Forest Land	626	Increase in carbon sinks	-295 071	0.2%	3 132
4.B - Cropland	27 634		22 504	123%	138 170
4.C - Grassland	228		14 880	2%	1 140
4.D - Wetlands	1 461	Increase in carbon sinks and reduction of emissions from drained peatlands	23 886	6%	7 303
Total CAP related (CRF 4.A + 4.B + 4.C + 4.D)	29 949		-233 802	13%	149 746
Total LULUCF (CRF 4)	**29 949**		**-243 025**	**12%**	**149 746**
Total estimated*	**35 072**		**211 827**	**17%**	**175 360**
Total estimated without energy**	**34 988**		**133 708**	**26%**	**174 941**

* Total estimated = 1.A.4.c - Agriculture/Forestry/Fishing + Total non-ETS agricultural emissions (CRF 3) + Total LULUCF (CRF 4)
** Total estimated = Total non-ETS agricultural emissions (CRF 3) + Total LULUCF (CRF 4)

Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other sources, EEA

[56] See footnote 3.

The main estimated mitigation potential is expected in CRF categories 4.B (cropland) and 3.D (agricultural soils).

The main estimated mitigation potential contribution from the CSPs (64% of 35.0 Mt total estimated potential) regards the enhanced carbon storage in soils on cropland, specifically, CRF category 4.B – LULUCF-cropland), resulting in a potential yearly reduction of 27.6 Mt CO_2e. As shown in Table 1 above, this represents 123% of the net emissions reported under this category for 2018-2022 (27.6 Mt out of 22.5 Mt), suggesting the possibility for the category to become a net sink, and 11% of the total of sector 4, including forestry sink capacity (26.7 Mt out of -243.0 Mt).

This outcome is mainly due to the eco-scheme interventions and compliance with GAEC 6 (minimum soil cover) and GAEC 7 (crop rotation in arable land). It is associated with practices:

- S23X (cover crops), S2X (soil cover) and S232 (winter cover crop), S22 (crop residues left on soil, leaving stubbles on the field), S25 (green cover on permanent crops)
- R11 (crop rotation), R14 (crop diversification), R17 (catch crops)
- F46 (use of compost)
- L211 (seeded flower areas/strips)

The other noticeable estimated mitigation potential is the decrease in non-CO_2 emissions from agricultural soils (category 3.D (agricultural soils)) by an estimated yearly potential of 5.0 Mt CO_2e, accounting for 14% of the total estimated potential contribution (5.0 Mt out of 35.0 Mt). As shown in Table 1 above, the 5.0 Mt represents 4% of the emissions reported under this category for 2018-2022 (5.0 Mt out of 114.8 Mt) and constitutes 1% of the emission levels from the whole agricultural sector – sector 3 (5.0 Mt out of 376.8 Mt).

These outcomes are primarily due to the ENVCLIM interventions followed by the eco-scheme and CIS interventions. The support for conversion to organic farming (associated with farming practice O12 (conversion to organic farming)) and nitrogen fixing crops (farming practice R121 (cultivation of nitrogen fixing/protein crops)) are the main contributors to category 3.D (agricultural soils), followed by practice F112 (ban on mineral fertilisers).

Limited potential contributions are expected in the other categories.

The estimations show some mitigation potential in **CRF category 4.D (wetlands)**, i.e. enhanced carbon storage in restored peatland. The estimated potential contribution represents nearly 4% of the total estimated (1.5 Mt out of 35.0 Mt) and 6% of the emissions reported in this category for 2018-2022 (1.5 Mt out of 23.9 Mt).

These outcomes are primarily due to the ENVCLIM interventions in Italy and Germany (62% of the estimated potential contribution). As already mentioned, the estimation for GAEC 2 is particularly challenging and the contribution to this category is only due to four CSPs providing enough information to perform the estimations, i.e. Estonia, Latvia, Lithuania and Sweden. The potential contribution of the GAEC 2 standards to CRF 4 is certainly significantly higher (see Box 4).

For **category 4.C (grassland)**, the estimated potential contribution to carbon removals shows a slight contribution of 0.7% to the total estimate (0.23 Mt out of 35.0 Mt), and 1.5% of the emissions reported in this category for 2018-2022 (0.23 Mt out of 14.9 Mt). This estimated contribution exclusively refers to the conversion of arable land to grassland (farming practice G27 (conversion of arable land to grassland)). The conversion of arable land to grassland was identified in seven CSPs (Belgium-Flanders, Czechia, Germany, Italy, Lithuania, Luxembourg and Slovakia) only, in ENVCLIM and eco-scheme interventions.

The estimations show no or non-significant mitigation potential in CRF categories 3.A (enteric fermentation), 3.B (manure management), 4.A (forest land), 4.C (grassland) and 1.A.4.c (energy – agriculture/forestry/fishing).

For the forest category, **CRF category 4.A**, only afforestation interventions can potentially enhance carbon removals [57]. Hence only two farming practices are associated with this CRF category: Y11 (afforestation of agricultural land) and Y21 (forest restoration and reforestation). The mitigation potential is estimated in 14 CSPs, through the ENVCLIM and INVEST interventions.

As for **category 3.A**, only a few farming practices are expected to have a potential positive contribution to mitigate methane emissions, and these are planned only through ENVCLIM interventions in Ireland. Similarly, very few farming practices target manure management (which would contribute to mitigating methane emissions from **CRF category 3.B**) with a significant mitigation potential (M12X (composting) and M141 (solid-liquid separation)). Only five interventions include these practices, and it concerns four CSPs (in Austria, Belgium-Flanders, Latvia and Malta).

Finally, **CRF category 1.A.4.c** indicates the potential contribution of investments in renewable energy supported through INVEST interventions identified considering result indicator R.15 (renewable energy from agriculture, forestry and other renewable sources). Although 21 out of 28 CSP contribute to the estimated mitigation potential in renewable energy, it is marginal compared to the national emissions reported in category 1.A.4.c [58] and compared to the overall estimated mitigation potential contribution of the 28 CSPs.

[57] Forest restoration and management (farming practices Y12 (maintenance of afforested land), Y22 (sustainable forest management) e.g. for biodiversity carbon sequestration fire genetic resources and clearance, and Y2X (forest management)) are expected to protect existing carbon storage capacity; therefore, their effect is accounted for under 'Protection of sinks'.
[58] 'Emissions from energy consumption in agricultural production' is only available in aggregate form for energy consumption in agriculture, forestry and fisheries.

3.2. Estimated mitigation potential contribution at CSP level

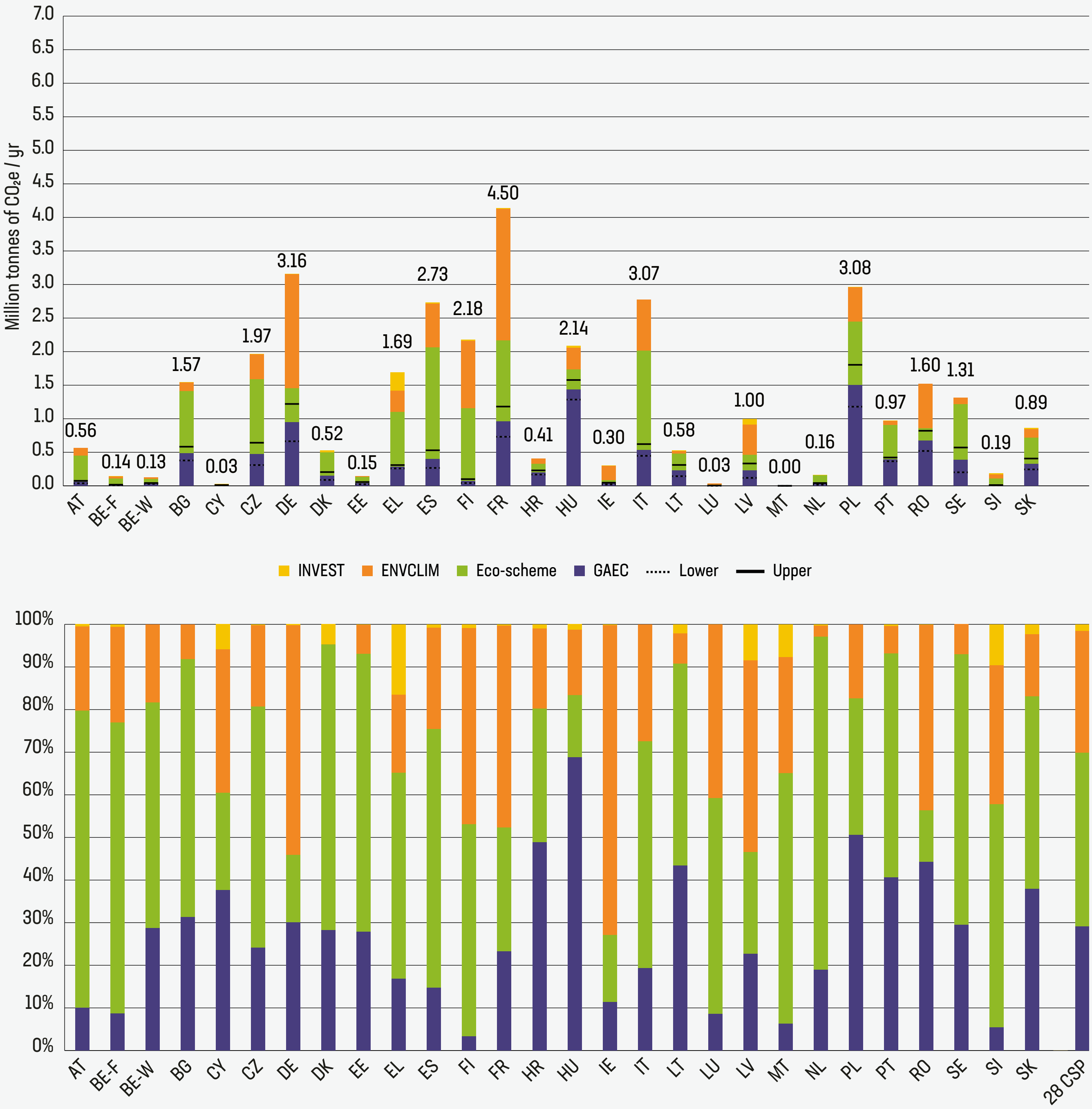
This section analyses the potential contribution of the 28 CSPs to the overall estimated mitigation potential of 35.0 Mt CO_2e per year.

3.2.1. Estimated mitigation potential per GAEC and type of intervention at CSP level

Figure 6 presents the breakdown of the estimated mitigation potential per CSP and type of intervention or GAEC. As mentioned in Chapter 2 Objectives and method, it is important to consider the difference in approach between interventions and GAECs.

Figure 6. CSP estimated mitigation potential per GAEC and type of intervention (Mt CO_2e/yr and %)

Example on how to read the graph: in Austria (AT), it is estimated that 0.56 Mt CO_2e per year of GHG emissions can potentially be avoided and/or removed from the atmosphere (upper graph). Approximately 70% of the potential estimated is due to the eco-scheme type of intervention, around 20% to ENVCLIM, about 10% to GAECs and less than 1% to INVEST (lower graph).



Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other sources

The estimated mitigation potential of the 28 CSPs ranges from 0.0024 Mt (for Malta) to 4.5 Mt CO_2e (for France). Notably, four CSPs – those of France, Germany, Italy and Poland, with a combined estimated potential of 13.8 Mt – account for 39% of the total estimated mitigation potential (representing 45% of the EU-27 UAA). In contrast, the ten CSP with the lowest estimated mitigation potential – those of Malta, Cyprus, Luxembourg, Belgium-Wallonia, Belgium-Flanders, Estonia, Netherlands, Slovenia, Ireland and Croatia – account for approximately 4% of the total estimated mitigation potential, reaching 1.5 Mt (representing 7% of the EU UAA).

The relative estimated mitigation contribution of the different types of intervention to the national estimated mitigation potential varies significantly from one CSP to another.

Overall, the contribution of the GAECs to the total mitigation potential ranges from 3% to 67% among the CSPs.

GAECs show a relatively higher estimated mitigation potential in Hungary, Poland and Croatia compared to the 28 CSPs average (i.e. at least 45% of the total estimate). The factors contributing to the relatively higher GAEC contribution in these Member States are:

- High values for GAEC 6 (minimum soil cover)
- High values for GAEC 5 (tillage management) in Hungary

Box 6. Specific observations on GAECs in Hungary, Poland and Croatia

GAEC 6 in Hungary, Poland and Croatia

The calculation method is based on the difference between the soil cover standard indicated in the CSP and a baseline, which is the 2016 Eurostat soil cover data for the country. In these three Member States, the targets are ambitious compared to the baseline conditions. The significant difference indicates that large areas should see new soil covers installed. These areas are associated with farming practices such as S25 (green cover on permanent crops), S22 (crop residues left on soil, leaving stubbles on the field) and S23X (cover crops).

GAEC 5 in Hungary

In addition, in Hungary, GAEC 5 is also estimated to have a significant potential contribution. Hungary is one of the few Member States where GAEC 5 shows a significant potential, alongside Czechia. However, estimating the contribution of GAEC 5 posed challenges due to considerable overlaps in farming practices between GAEC 5 and GAEC 6. This overlap complicates the clear delineation of areas addressed by each standard. As a result, in certain regions – such as Belgium-Flanders, Belgium-Wallonia, Latvia, Lithuania, Sweden, Slovenia and Slovakia – the potential contribution of GAEC 5 is not estimated separately but is instead considered as part of the impacts attributed to GAEC 6.

Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025)

On the other hand, GAECs are estimated to have a relatively low potential contribution in Finland, Slovenia, Malta, Luxembourg, Belgium-Flanders, Austria, Ireland and Slovakia compared to the average (i.e. up to 13% of the total estimate).

Box 7. Specific observations on GAECs in Finland, Slovenia, Malta, Luxembourg, Belgium-Flanders, Austria, Ireland and Slovakia

These CSPs show low values in GAEC 6 (minimum soil cover) and GAEC 7 (crop rotation), except in Slovakia. In addition, no other GAEC is estimated to have a potential significant contribution for these CSPs, thereby contributing to the relatively low overall estimated mitigation potential from GAECs.

GAEC 6 – Minimum soil cover

To estimate the potential contribution of GAEC 6, a comparison was made between the target set in the requirements and a baseline which is the 2016 Eurostat soil cover data for the country. The CSPs of Austria (only for arable land), Belgium-Flanders, Finland, Malta, Slovenia set targets lower or almost at the same level as their bare soil ratios. In these cases, it is considered that the GAEC does not have a constraining potential and will not result in an increase in the area covered. Therefore, for these CSPs, no mitigation potential is estimated for the GAEC.

For Ireland, the estimate for GAEC 6 is low due to the limited areas of bare soil. For Luxembourg, the estimate is low due to few areas with a risk of erosion included as baseline.

GAEC 7 – Crop rotation

For GAEC 7, the approach considers the proportion of annual rotation required at farm level. For Austria, Belgium-Flanders, Finland or Luxembourg, the requirement is low, at around two-thirds of the farm total area. Combined with exemptions that can amount to half the arable land area, and/or with the limited UAA in the country, this may explain the low contributions estimated for these CSPs.

In certain Member States, such as Slovenia or Malta, the estimate is low as more of the majority (over 80% and 90% respectively) of the arable land is covered by exemptions (e.g. area of farms with less than 10 hectares, plants harvested green area and organic farming area).

GAEC 2 – Protection of wetlands and peatlands

As mentioned already, the estimation of the potential contribution of GAEC 2 is challenging and certainly an underestimate. This is particularly the case for Finland, whose CSP provides for a ban on peat extraction, the potential contribution of which is not included in the calculation. See Box 4.

Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025)

The contribution of different types of intervention to the total estimated mitigation potential varies significantly across CSPs

The contribution of the eco-scheme intervention to the total estimated mitigation potential varies between 11% and 78%, while the contribution of the ENVCLIM intervention ranges from 0% to 72%.

In the Netherlands, Austria, Belgium-Flanders, Denmark, Estonia, Sweden and Spain, the eco-schemes account for a much higher share of the estimated potential, compared to the 28 CSPs' average (i.e. above 60% of the total estimate). Whereas in Ireland and Germany, ENVCLIM interventions account for more than 50% of the total estimate.

Box 8. Specific observations on the contribution of eco-scheme and ENVCLIM interventions in selected CSPs

Below is the relatively high share of eco-scheme and ENVCLIM types of intervention in the estimated mitigation potential of selected CSPs.

Eco-scheme > ENVCLIM

The Netherlands:

- The eco-scheme primarily targets farming practices with mitigation effects such as S2X (soil cover), L111 (creation of new hedges/wooded strips), R17 (catch crops) and R121 (cultivation of nitrogen fixing/protein crops).
- On the contrary, 50% of the area planned to be covered by ENVCLIM is linked to farming practices that are not expected to contribute directly to climate change mitigation (G12, G221, G2X, L15X, L45, S13 and P22) [59].

Austria:

- The eco-scheme is expected to contribute significantly to increasing the areas with catch crops (R17), thereby contributing 31% of the estimated mitigation potential of the CSP.
- In contrast, the ENVCLIM interventions focus on the protection of sinks (O11 (maintenance of organic farming practices)) and have a lower expected mitigation potential.

Belgium-Flanders:

- In the estimation, the eco-scheme outweighs the ENVCLIM interventions because of the potential contribution of two farming practices with high coefficient values: F46 (use of compost) and F112 (ban on mineral fertilisers). These two farming practices account for 44% of the estimated mitigation potential of the eco-scheme of the Belgian-Flemish CSP.

Denmark:

- The contribution of the Eco-scheme is relatively higher than ENVCLIM because no mitigation potential could be estimated for ENVCLIM. The ENVCLIM intervention is associated with the farming practice Y22 (sustainable forest management), that contributes to the protection of sinks (and not to mitigation) and with the farming practice L5X (management of wetland/peatland), that has a high mitigation potential, but for which data to estimate the areas concerned are not sufficient.

Estonia:

- The Eco-scheme is expected to contribute significantly to increasing the areas with catch crops (R17) and protein crops (R121). These two farming practices account for 46% of the estimated mitigation potential of the eco-scheme of the Estonian CSP.
- The ENVCLIM interventions focus on the protection of sinks (G25 (ban of ploughing of grassland), G26 (no conversion of grassland into other uses) and L512 (peatland maintenance and conservation)) and therefore have a lower expected mitigation potential.

ENVCLIM > Eco-scheme

Ireland:

- In the ENVCLIM intervention, the organic farming scheme support for conversion (farming practice O12) contributes 57% of the estimated mitigation potential of the CSP.
- On the other hand, the estimated mitigation potential of the eco-scheme is low because the intervention is associated with farming practices that do not have coefficient values, due to the lack of data or absence of proven positive effect (G131, G132, F214, F121, F33) [60].

Germany:

- The ENVCLIM support for the conversion to organic farming (farming practice O12) is expected to be very large and it is estimated to contribute to half of the CSP estimated mitigation potential.
- On the other hand, the eco-scheme (extensification of permanent grassland) does not contribute to the estimated mitigation potential, despite the area covered (nearly 10 million hectares in total over the 2023-2027 period), because the three farming practices supported have no coefficient value [61].

Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025)

[59] G12 (none or restricted grazing), G1X (grazing management), G21 (mowing obligations), G221 (mowing restriction on timing), G2X (grassland management), L15X (ditches), P22 (limitation in quantity of plant protection products), S13 (restriction on tillage).
[60] G131 (minimum stocking density), G132 (maximum stocking density (extensive grasslands)), F214 (solid manure incorporation (within 24h)), F121 (max mineral fertiliser input), F33 (amendment with lime).
[61] The intervention is associated with three farming practices for which no coefficient value is available: G11 (minimum grazing period), G131 (Minimum stocking density) and G132 (Maximum stocking density (extensive grasslands)).

Contribution of CIS for protein crops and INVEST interventions is relevant only in few CSPs.

CIS interventions for protein crops are included in 16 CSPs. They are estimated to contribute significantly to the mitigation potential (contributing to more than 3% of the total estimated) only in Italy, France, Lithuania, Romania and Poland.

As for INVEST, this type of intervention is contributing to the estimated mitigation potential mainly in Greece (16%), Slovenia (9%), Malta (8%) and Latvia (8%).

Box 9. Specific observations on the contribution of INVEST in Greece, Slovenia, Malta and Latvia

In Greece, Malta and Latvia, the farming practice section [62] Y (forestry) is responsible for the relatively high estimations.

In Greece, the farming practices Y21 (forest restoration and reforestation) and Y11 (afforestation of agricultural land) account for 17% of the total estimated mitigation potential (0.3 Mt out of 1.7 Mt).

In Slovenia, section B (bioeconomy), energy efficiency and production generates the most significant contribution of INVEST interventions, especially with the farming practice B21X (biogas), representing 9% of the total estimated mitigation potential of the CSP.

In Malta and Latvia, the farming practice Y21 represents 8% and 11% respectively of the total estimated mitigation potential of the CSP (0.18 kt out of 2.4 kt for Malta and 0.11 Mt out of 1.0 Mt for Latvia).

Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025)

The estimation of INVEST interventions' mitigation potential is particularly challenging and requires specific assumptions, as this type of intervention is usually paid per operation. The approach to estimate a potential contribution primarily relies on the target values attributed to result indicators (R.15, R.16, R.17, R.27 and R.30) [63]. However, relevant data are not always provided in the CSPs, making it impossible to estimate the INVEST potential contribution. For instance, in Germany, the potential contribution of non-productive investments in the forestry sector (intervention EL-0407) cannot be estimated due to insufficient information in the CSP regarding the areas expected to be covered.

Additionally, there is a risk of double counting in cases where INVEST interventions are complementary to ENVCLIM or eco-scheme interventions. For example, potential contributions of INVEST support for productive investments on farms related to organic farming, such as in the intervention 3.23 in the CSP of Belgium-Flanders, are not estimated in order to avoid any double counting with the potential contribution estimated for direct support for conversion to or maintenance of organic farming.

3.2.2. Estimated mitigation potential per CRF category at CSP level

In Figure 7, the estimated potential contribution per CRF category shows significant variation across the 28 CSPs in the study.

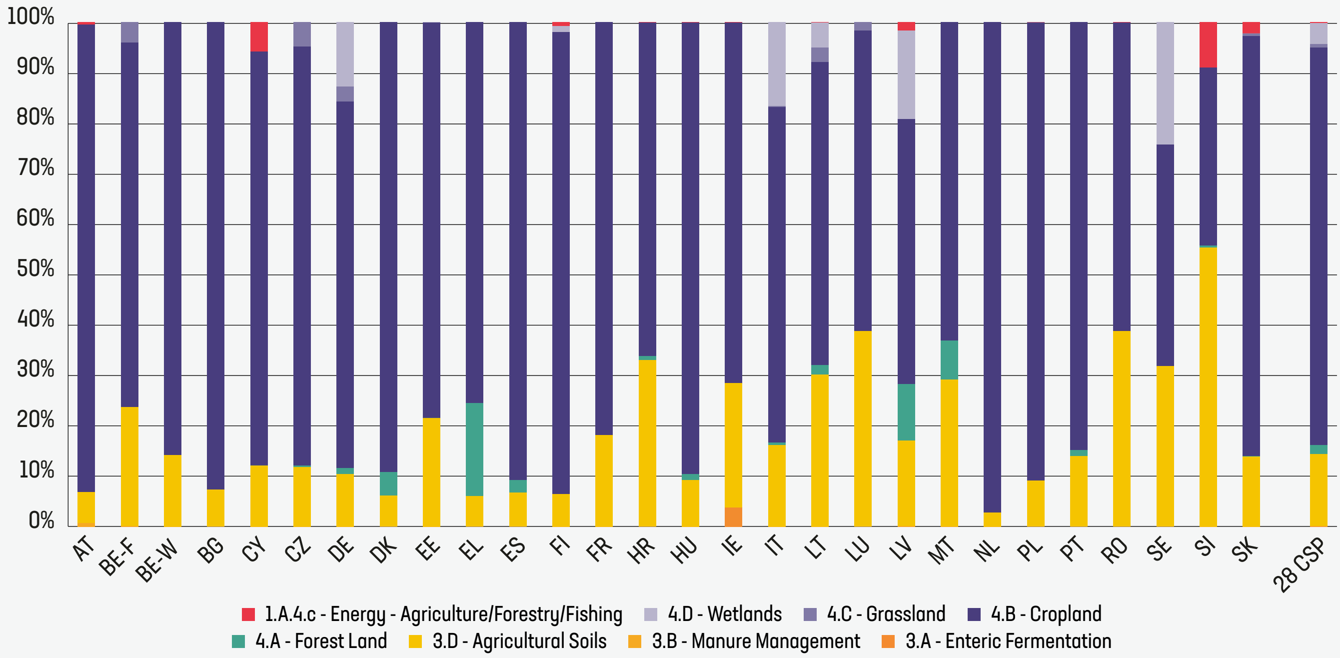
At the EU level, 79% of the estimated annual mitigation potential is associated with the CRF category 4.B (LULUCF-cropland), while 14% is associated with the category 3.D (agricultural soils) (see Figure 4).

[62] See Box 2.

[63] R.15 – Renewable energy from agriculture, forestry and from other renewable sources; R.16 – Investments related to climate; R.17 – Afforested land; R.27 – Environmental or climate-related performance through investment in rural areas; and R.30 – Supporting sustainable forest management.

Figure 7. Estimated mitigation potential per CSP and CRF category

Example on how to read the graph: In Austria (AT), it is estimated that more than 90% of the mitigation potential is linked to enhancing carbon sequestration in cropland areas (CRF category 4.B (LULUCF-cropland)), and around 6% is linked to reducing non-CO_2 emissions from agricultural soils (CRF category 3.D (agricultural soils)).



Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other sources

Certain elements stand out when comparing the various CSPs with the 28 CSPs estimated average:

While the EU average estimated mitigation potential linked with CRF category 4.B (LULUCF-cropland) is 79%, it is below 65% in seven CSPs.

For Slovenia, Sweden, Latvia, Luxembourg, Lithuania and Romania, the mitigation potentials estimated associated with CRF category 4.B range from 35 to 63% of the total estimated at CSP level. In these CSPs, the estimated mitigation potential linked to CRF category 4.B is mainly (83%) due to a large contribution from farming practices O12 (conversion to organic farming practices), R11 (crop rotation), S23X (cover crops) and R17 (catch crops). In contrast, in other CSPs, where the estimated contribution linked to CRF 4.B is higher, it comes from a wider range of practices, including in addition to practices mentioned above: R14 (crop diversification), S2X (soil cover), S232 (winter cover crop), S22 (crop residues left on soil, leaving stubbles on the field) or F46 (use of compost).

While the EU average estimated mitigation potential linked with CRF category 3.D (agricultural soils) is 18%, in six CSPs it is less than 7%.

For Netherlands, Greece, Austria, Denmark, Finland and Spain, the estimated mitigation potential association with CRF 3.D ranges from 3–7%. In these CSPs, the majority (85%) of the potential contribution estimated related to CRF 3.D comes from farming practices O12 and F1X (limitations on the use of fertilisers). In contrast, in other CSPs, where the estimated contribution linked to CRF 3.D is higher, it is derived from a wider range of practices, including S2X, F112 (ban on mineral fertilisers), R121 (cultivation of nitrogen fixing/protein crops) or E1X (precision agriculture), in addition to the practices mentioned above.

In five CSPs, the estimated mitigation potential related to CRF category 4.D (wetlands) contributes significantly (above 5%) to the total estimated potential.

Sweden, Italy, Latvia, Germany and Lithuania include farming practices related to CRF category 4.D that contribute significantly to the total potential estimated. They are linked to GAEC 2 for Latvia, Lithuania and Sweden, and to ENVCLIM interventions for Italy and Germany. It is important to note, as already mentioned in Box 4, that the estimated potential contributions of GAEC 2 to wetlands and peatlands restoration presented in this report are overall underrated.

Other remarks

In Czechia, Belgium-Flanders, Germany and Lithuania, the protection of grasslands (CRF 4.C (grassland)) holds particular importance thanks to the expected implementation of farming practice G27 (conversion of arable land to grassland).

In Greece, Latvia, Malta and, to a lesser extent, Denmark and Spain, interventions targeting the increase of agroforestry or sustainable forest management (CRF category 4.A (forest land) has a relatively higher contribution to the mitigation potential than the other CSPs.

Ireland stands out as the only CSP for which a mitigation potential is linked to subcategory 3.A (enteric fermentation) is estimated. As mentioned above, this is because the Irish CSP is the only one that includes an intervention promoting animal selection.

For Slovenia and Cyprus, more than 5% of the total estimated mitigation potential is associated with the subcategory 1.A.4.c (energy – agriculture/forestry/fishing), exclusively linked to the INVEST interventions.

4. Estimated protection of carbon sink potential contribution

The protection of carbon sinks describes the estimated potential contribution expected from the CSP interventions and the application of GAECs towards the protection of carbon stored in soils (grasslands, peatlands, lands under organic farming) or woody features (forests, hedgerows) by maintaining these areas and encouraging their sustainable management.

The coefficient values associated with the farming practices favourable to carbon protection, as per the JRC classification, account for the difference in carbon sequestration compared to the maintenance of existing practices. The coefficient can be null when maintaining a practice does not deliver an additional effect and it is in any case lower than the corresponding farming practice that is newly implemented (for instance the coefficient value of G26 (no conversion of grassland into other uses) is lower than the one of G27 (conversion of arable land to grassland)). See Annex 1 - Farming practice emissions and removal coefficients for the practices with a coefficient value associated with protection.

The estimated carbon sink protection potential is linked to a smaller number of farming practices compared to farming practices linked to emission reductions and removals. The dedicated chapter presents the results of the protection of carbon sinks of the 28 CSPs assessed more concisely than the chapter analysing the estimated mitigation potential but following the same logic.

4.1. Estimated protection of carbon sink potential contribution at EU level

The analysis of the 28 CSPs indicates a potential positive contribution to the protection of existing carbon sinks of 32.0 Mt CO_2e yearly across the 27 Member States.

Ten farming practices are estimated to contribute to protect carbon stored in soil or in biomass.

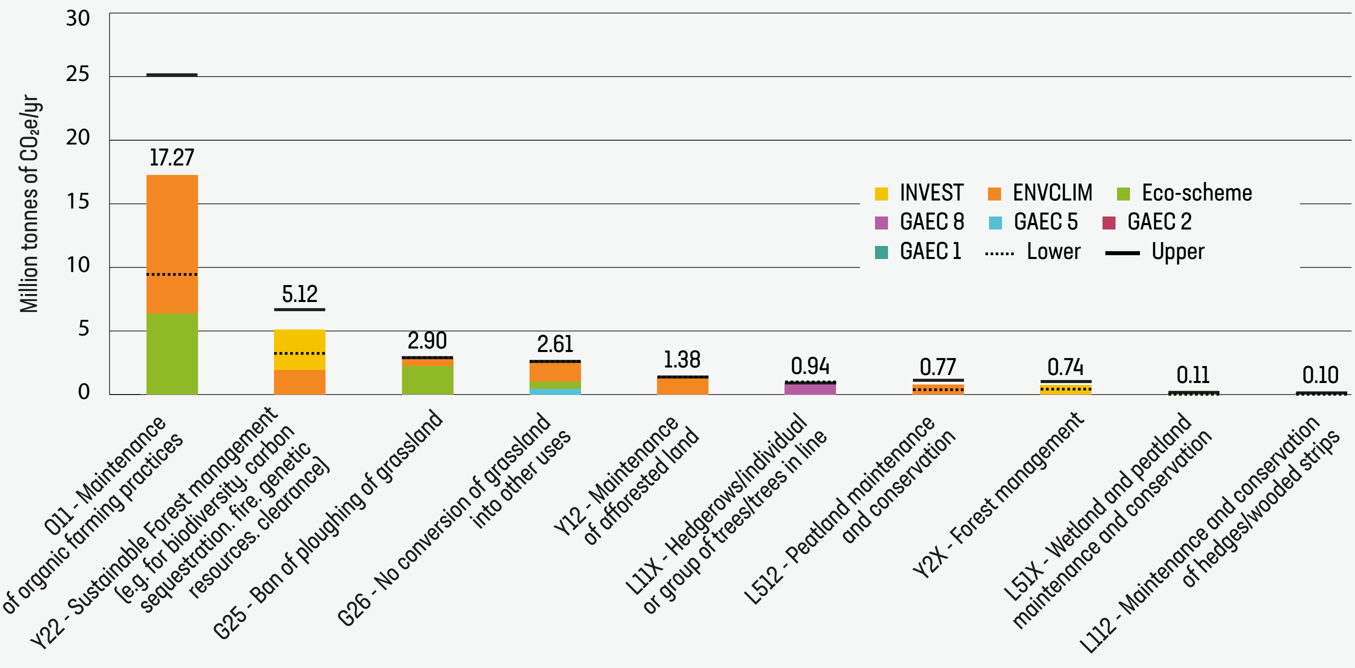
Figure 8. Estimated carbon sink protection potential (Mt CO_2e/year) – all types of intervention and requirements (GAECs) included, in 28 CSPs

The graph presents the exhaustive list of farming practices estimated to have a potential effect on the protection of carbon sinks (ten farming practices).

Aggregation is done by summing the estimated potential per farming practice in each CSP. The protection potential per farming practice is the sum of the areas covered by each practice multiplied by the coefficient mean value.

The markers in black (lower/upper) represent the upper and lower bounds of the 95% confidence interval of the coefficient per practice (the bigger the interval, the less accurate is the coefficient value of the farming practice concerned). When markers overlap, it means that the confidence interval is not available.

Example on how to read the graph: by maintaining organic farming practices (O11), the CSPs contribute to protect the carbon stock already stored. The overall quantification of the potential contribution is estimated at 17.25 Mt CO_2e yearly, i.e. the annual additional removal capacity of organic farming compared to conventional practices, multiplied by the areas benefiting from support to organic maintenance.



Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other source

One single farming practice, i.e. O11 (maintenance of organic farming practices), significantly contributes to the estimated protection potential, accounting for 54% of the total estimated protection potential. Across the 28 CSPs, this farming practice is exclusively supported via eco-scheme and/or ENVCLIM types of intervention.

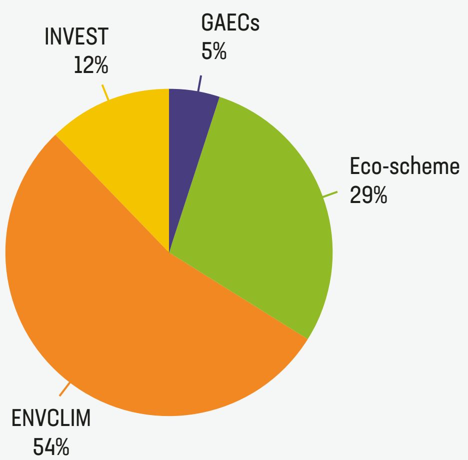
The group of farming practices related to forestry, Y22 (sustainable forest management) e.g. for biodiversity, carbon sequestration, fire, genetic resources clearance), Y12 (maintenance of afforested land) and Y2X (forest management), accounts for 23% of the estimated protection potential altogether.

Protection of grasslands (practices G25 (ban of ploughing of grassland) and G26 (no conversion of grassland into other uses)) comes third, contributing to 17% of the total estimated protection potential.

Finally, some limited contributions are estimated to be due to the maintenance or protection of hedgerows, trees, and peatlands (practices L11X (hedgerows/individual or group of trees/trees in line), L112 (maintenance and conservation of hedges/wooded strips), L51X (wetland and peatland maintenance and conservation) and L512 (peatland maintenance and conservation)).

Figure 9. Estimated protection potential per type of intervention and GAEC (%)

Example on how to read the graph: across the 28 CSPs, 54% of the estimated carbon sink protection potential is linked with the implementation of ENVCLIM interventions.



Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other sources

Looking at the results per type of intervention and GAEC, the following can be noted:

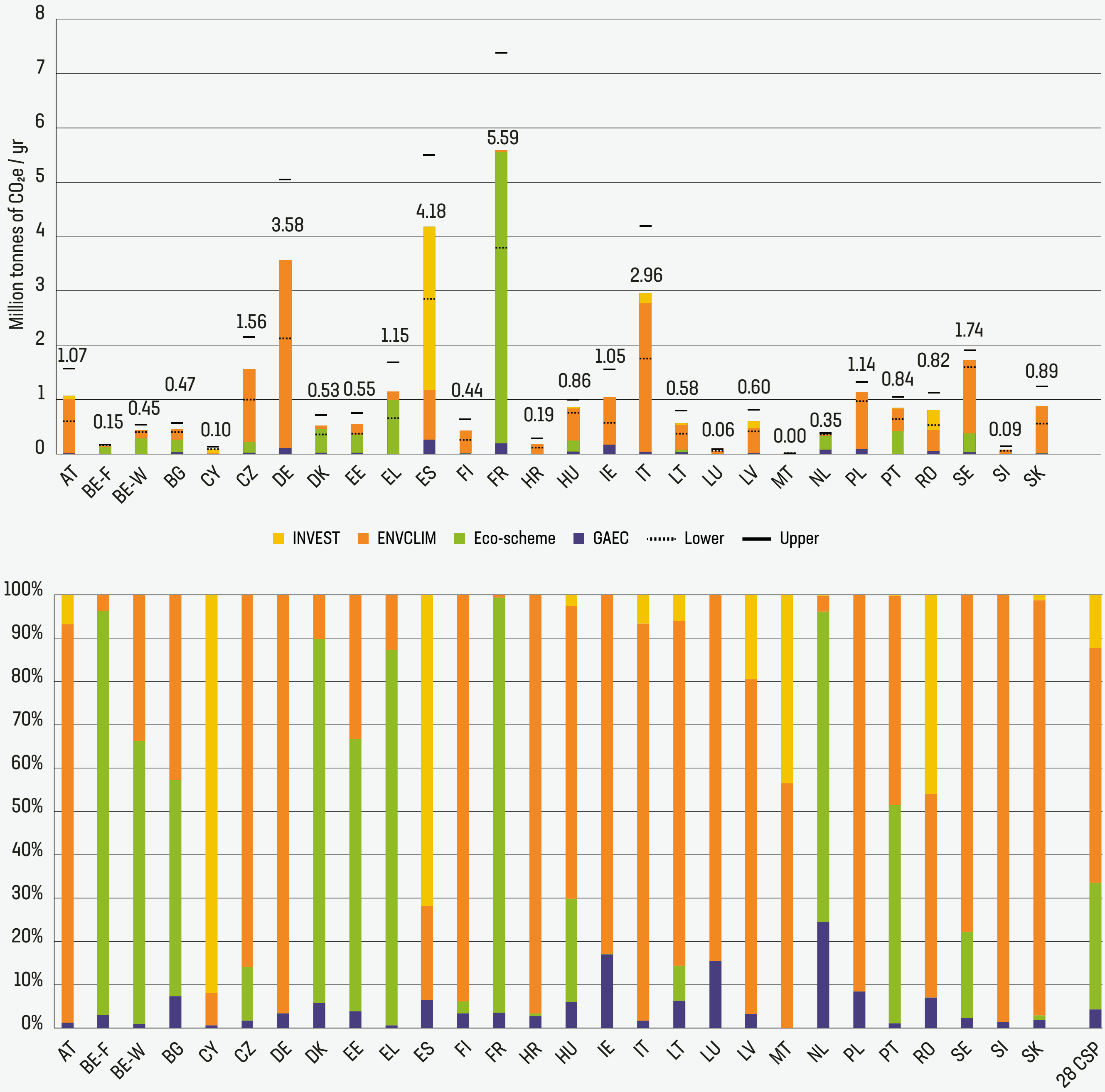
- **ENVCLIM** stands out as the main type of intervention contributing to the estimated protection potential. The maintenance of organic farming is mostly supported through this type of intervention (accounting for 63% of the ENVCLIM protection potential). The farming practices Y22 (sustainable forest management), G26 (no conversion of grassland into other uses), and Y12 (maintenance of afforested land), represent 11%, 9% and 8% of the ENVCLIM protection potential estimated, respectively. The farming practice on peatlands conservation and maintenance (L512) is exclusively associated with ENVCLIM interventions.
- **Eco-schemes** also have a significant estimated protection potential. Also, in this case, this is mostly because they support the maintenance of organic farming practices (68% of the estimated protection potential of eco-schemes), but also significantly through the farming practice G25 (ban on ploughing grassland), 24% of the estimated protection potential of eco-schemes.
- The estimated protection potential of **INVEST** interventions is instead almost exclusively linked to support for sustainable forest management.
- Due to the difficulty of quantifying the contribution of **GAECs' standards** against a baseline, the applied approach for GAECs shows an estimated small net additional contribution (these measures are mostly to maintain carbon in soils).
  - The expected potential contribution **of GAEC 1 (maintenance of permanent grassland)** estimated in the study is limited to the grassland areas that will not be converted into cropland to comply with the standards. The estimated contribution of this GAEC to carbon is also limited since this obligation has been in place for many years.
  - **GAEC 2 (protection of wetlands and peatlands)** includes, in certain CSPs, restrictions on land-use change, which should contribute to the protection of carbon sinks. However, the assessed CSPs do not include enough data for a precise estimation of the protected areas. It should be noted that, based on the coefficients available for the farming practices related to peatland conservation, the contribution of GAEC 2 on the protection of carbon sinks could be potentially more significant, providing that the data to estimate the area covered are available.
  - **GAEC 8 (non-productive areas and features)** is expected to contribute to the protection of carbon stored in biomass and soil by preserving the existing hedgerows (L11X (hedgerows/individual or group of trees/trees in line)). Nevertheless, the approach applied to this GAEC delivers limited results.

4.2. Estimated protection of carbon sink potential contribution at CSP level

In this section, the contribution of the 28 CSPs to the overall carbon sink protection potential is assessed.

Figure 10. Estimated carbon protection potential per CSP, all types of intervention and GAECs included, in mass units and relative values

Examples on how to read the graph: (upper graph) in Austria (AT), the estimated carbon sink protection potential is estimated in approximately 1.1 Mt CO_2e per year. (lower graph) Approximately 90% of the estimated protection potential is due to ENVCLIM interventions, around 5% to INVEST and about 1% to GAECs.



Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other sources

France, which accounts for 17% of the EU-27 UAA, has the CSP with the highest estimated protection potential (17% of the total protection potential estimated across EU-27). The estimated protection potential contribution of the French CSP is due almost exclusively to the eco-scheme intervention which promotes both the maintenance of organic farming (72% of the estimated protection potential) and the maintenance of grassland (28% of the estimated protection potential).

Spain (15% of EU-27 UAA), **Germany** (10%) and **Italy** (8%) account for significant shares of the total estimated, 13%, 11% and 9% respectively. The estimated protection potential for Germany and Italy is almost exclusively due to the ENVCLIM intervention, whereas, in Spain the results indicate that over 70% of the estimated potential is related to INVEST. In both Member States, the estimated protection potential is due mainly to the payments to maintain organic farming (accounting for 77% and 88% of the estimated protection potential under the Italian ENVCLIM intervention respectively).

As in Germany or Italy, **ENVCLIM interventions show a relative contribution higher than the EU average** in Member States such as Poland, Austria, Romania, Slovakia and Slovenia, among others.

Conversely, as in France, **eco-scheme interventions account for a relative contribution higher than the EU average** in Belgium-Flanders, Denmark, Greece, Estonia and Portugal, among others.

The ten CSPs with the lowest estimated protection potential – those of Malta, Luxembourg, Slovenia, Cyprus, Belgium-Flanders, Croatia, Netherlands, Finland, Belgium-Wallonia and Bulgaria (representing 8% of the EU-27 UAA) – account for 9% of the total estimated protection potential across the EU-27, reaching 2.8 Mt CO_2e.

Another point that stands out is the contribution of INVEST interventions to the estimated protection potential for the Cypriot, Spanish, Romanian and Maltese CSPs. INVEST type of intervention contribution to the total estimated protection potential in Cyprus represents 92% of the total protection estimated. This contribution is associated with one INVEST intervention enhancing the areas related to sustainable forest management. At the EU-27 level, INVEST interventions are estimated to contribute to 12% of the total potential estimated.

Figure 11. Estimated carbon sink protection potential per CSP and per farming practice

The ten farming practices estimated to have a potential contribution on the protection of carbon sinks are grouped under four types of practices (called 'sections' in the JRC classification – which correspond to the first letter of the code):

Organic farming

- *O11 – Maintenance of organic farming practices*

Landscape

- *L112 – Maintenance and conservation of hedges/wooded strips*
- *L11X – Hedgerows/individual or group of trees/ trees in line*
- *L512 – Peatland maintenance and conservation*
- *L51X – Wetland and peatland maintenance and conservation*

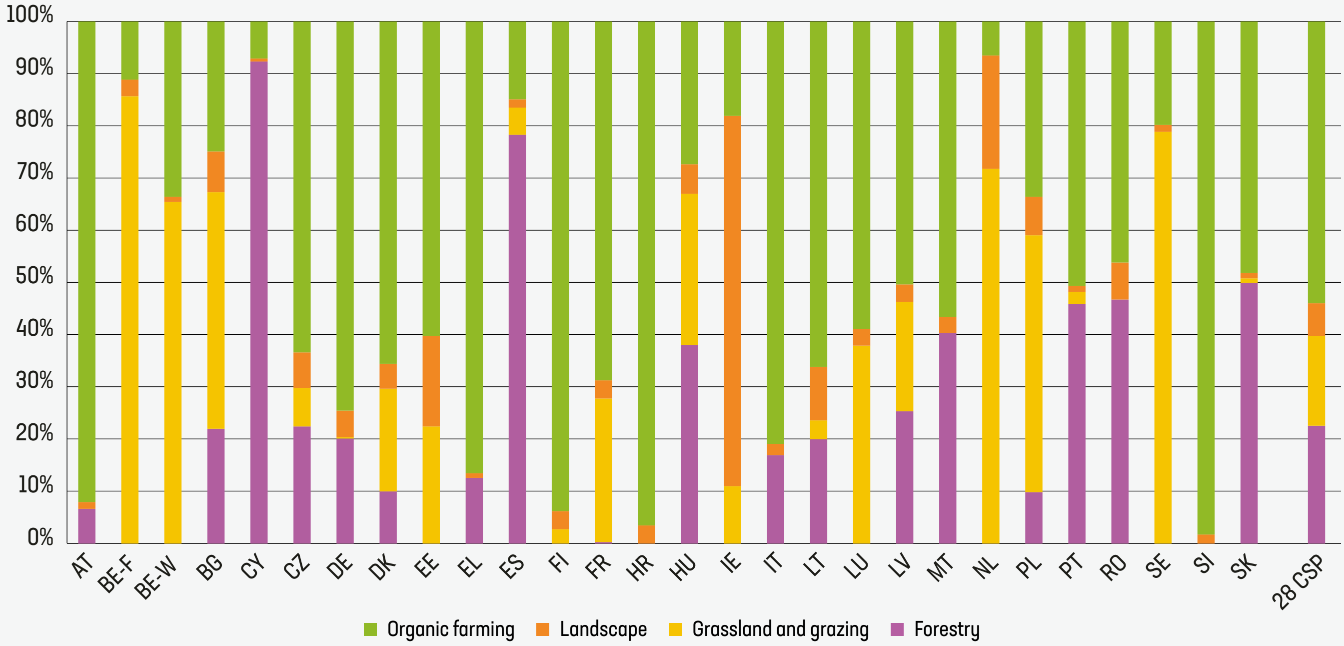
Grassland and grazing

- *G25 - Ban of ploughing of grassland*
- *G26 – No conversion of grassland into other uses*

Forestry

- *Y12 – Maintenance of afforested land*
- *Y22 – Sustainable forest management (e.g. for biodiversity, carbon sequestration, fire, genetic resources and clearance)*
- *Y2X – Forest management*

<u>Example on how to read the graph:</u> in Austria (AT), it is estimated that approximately 90% of the protection potential is linked to the maintenance of organic farming, around 7% to forestry-related farming practices and the remainder to landscape-related practices. No estimated protection potential is linked to grassland and grazing farming practices.



Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other sources

Figure 11 shows that **the maintenance of organic farming often represents the main source of estimated protection potential**. This farming practice is either supported by eco-scheme or ENVCLIM interventions.

As previously outlined, interventions linked to forest management can also play a significant role in safeguarding carbon sinks, notably in Cyprus, Spain, Romania and Malta, as well as in Slovakia, Portugal and Hungary, where ENVCLIM interventions support the maintenance of afforested land.

The preservation of carbon sinks through grassland maintenance varies widely across CSPs. In Sweden and Poland, ENVCLIM interventions are estimated to contribute significantly to the protection of grassland. On the other hand, in Belgium-Wallonia, Belgium-Flanders and the Netherlands, grassland conservation is primarily achieved through eco-schemes, which are estimated to cover extensive areas. Luxembourg has the only CSP with grassland conservation supported by ENVCLIM interventions and GAEC 5 (tillage management). In all these CSPs, grassland protection is expected to constitute a significant share of the CSP estimated protection potential.

Finally, in Ireland most of the CSP estimated protection potential is linked to an ENVCLIM intervention aiming **at protecting peatlands**.

5. Towards EU climate targets

The quantification of the CSP's mitigation and carbon protection potential is important to determine several policy conclusions. Beyond the policy assessment in terms of effectiveness and efficiency, it also presents an opportunity to obtain insights on alignment and potential gaps with climate policies at the EU and national level. One example of the use of the study results could be its comparison with EU climate targets, analysed in this chapter. Even if the comparison cannot be made directly because of the methodological inconsistencies between the study's approach and IPCC methodological guidance, it can provide information on the CSPs' contribution to climate policies and highlight where improvements are necessary to accurately determine their contribution.

Overall emissions of agriculture and LULUCF

According to the data reported by Member States under the EU Governance Regulation (EU) 2018/1999 [64], the agricultural sector is estimated to have emitted an average of 377 Mt CO_2e per year over the 2018-2022 period, accounting for 12% of the estimated EU's total GHG emissions [65]. Two-thirds of the emissions originate from the livestock sector (enteric fermentation and manure management) for which the results presented previously indicate that the potential to mitigate emissions is estimated to be negligible. In addition, LULUCF sector activities are estimated to have removed 243 Mt CO_2e from the atmosphere, on average per year over the same period, equivalent to 7% of the EU's annual estimated GHG emissions.

Estimated CSP potential contribution

Analysis of the 28 CSPs indicates a potential positive contribution to GHG emission reduction and enhanced removal across the 27 Member States of 35 Mt CO_2e annually (see Section 3.1.1).

This positive contribution is potential and comes with a range of uncertainties due to the assumptions made, as explained in Chapter 2. Results are to be considered with caution and only as an indicative order of magnitude.

The 35 Mt can be divided mainly into (see Table 1):

- 5 Mt of GHG emission reduction under CRF category 3.D (agricultural soils);
- 28 Mt of removals under CRF category 4.B (LULUCF-cropland); and
- 2 Mt under the other LULUCF categories.

EU climate neutrality objectives

This chapter puts the CSPs' estimated potential contribution into context with the EU's climate neutrality objectives within the agriculture and LULUCF sectors. The goal is to assess how far it is possible to define whether the CSPs assessed support emission reduction actions and removals that are consistent with the targets set at the EU level. The analysis focuses on two key regulations which are integral components of the EU's climate framework and impact assessments:

- **The Effort Sharing Regulation (EU) 2018/842** [66], covering non-CO_2 emissions from agriculture (methane and nitrous oxide).
- **The LULUCF Regulation (EU) 2018/841** [67], mainly addressing CO_2 emissions and carbon removals from LULUCF.

5.1. Non-CO_2 emissions from agriculture and the ESR

The Effort Sharing Regulation (ESR), which encompasses the agriculture sector, excluding land use, mandates an overall GHG reduction target of 40% by 2030, distributed amongst Member States. However, it does not establish specific EU or national targets for agricultural emissions. The national targets refer to all ESR sectors, where the relative importance of agriculture varies among Member States.

Each Member State can decide on the emission reductions to be achieved in its own agricultural sector following the cost-efficiency principle. Recent reviews of national agricultural policies related to climate change indicate that in a majority of Member States (19 out of 27), no sectoral target for agricultural emissions was set (Van Hoof 2023) [68]. The few national targets [69] are not considered here due to the diversity in the format of the targets, which hinders comparability.

[64] See footnote 1.
[65] See footnote 3.
[66] See footnote 10.
[67] See footnote 11.
[68] Van Hoof, S., *Climate Change Mitigation in Agriculture: Barriers to the Adoption of Carbon Farming Policies in the EU*, Sustainability, 15, 2023, 10452. https://doi.org/10.3390/su151310452.
[69] The national targets were extracted from OECD. *Agricultural Policy Monitoring and Evaluation 2022: Reforming Agricultural Policies for Climate Change Mitigation;* OECD Publishing: Paris, France, 2022. https://doi.org/10.1787/22217371 and include the following:

- Denmark (2021): 55% to 65% CO_2e reduction in GHG emissions from agriculture and forestry by 2030 compared to 1990 levels.
- France (2020): 72 Mt CO_2e carbon budget for agriculture and forestry (excl. LULUCF) in 2029-2033.
- Germany (2019): 56 Mt CO_2e permissible annual emission budget for agriculture in 2030.
- Ireland (2022): 25% emission reduction for agriculture by 2030 (17.25 Mt CO_2e), compared to 2018 levels (23 Mt CO_2e).
- Lithuania (2021): 11% GHG emission reduction in 2030 compared to 2005.
- Malta (2019): 50% reduction of nitrogen in manure.
- The Netherlands (2019): 3.5 Mt GHG emission reduction in agriculture and land use sectors by 2030.
- Portugal (2019): 11% reduction of CO_2e emissions for Agriculture (CRF 3 and 1A4c) by 2030 compared to the 2005 reference values.
- Slovenia (2021): 22% emission reduction by 2050 in agriculture, compared to 2005.
- Belgium (2021): 25% reduction in agriculture GHG emissions by 2030 compared to 2005.

Revised and additional commitments may have been made.

However, the impact assessment of the Fit for 55 package [70], includes modelled emissions and removal levels for 2030 for different sectors (including agriculture) and scenarios. The 2030 emission level defined for the agricultural sector in the mix scenario [71] is 360.78 Mt CO_2e, and is used here for comparison with the estimated potential contributions.

The total estimated potential contribution to reducing non-CO_2 emissions mentioned above, 5 Mt CO_2e per year, can be compared to the distance to the 2030 emission level for agriculture as modelled in the impact assessment: 5 Mt CO_2e represent 32% of the gap between the current emissions levels reported in national inventories and the 2030 emission level for agriculture defined in the mix scenario of the Fit for 55 impact assessment, hereinafter referred to as 'distance to the 2030 emission level for agriculture defined in the impact assessment'.

Table 2:

- to the EU agricultural emissions reported in national inventories: 5 Mt represent 1.4% of EU emissions reported in CRF sector 3 (agriculture) (average 2018-2022); and
- to the distance to the 2030 emission level for agriculture as modelled in the impact assessment: 5 Mt CO_2e represent 32% of the gap between the current emissions levels reported in national inventories and the 2030 emission level for agriculture defined in the mix scenario of the Fit for 55 impact assessment, hereinafter referred to as 'distance to the 2030 emission level for agriculture defined in the impact assessment'.

Table 2. Comparison of the estimated potential contribution of the CSPs with the average 2018-2022 national inventories emissions - CRF 3, and with the 2030 emission level for agriculture defined in the impact assessment for the Fit for 55 package (EU)

Estimated mitigation contribution - CRF 3	Average 2018-2022 national inventory emissions - CRF 3	Fit-for-55 Mix scenario 2030 value for agriculture	Distance to 2030 emission level for agriculture defined in the impact assessment (mix scenario)	Ratio of estimated potential to inventory data	Ratio of estimated potential to the distance to 2030 emission level for agriculture defined in the impact assessment
a	b	c	d = c-b	a/b	a/d
5 Mt	377 Mt	361 Mt	-16 Mt	1.4%	32%

Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other sources, EEA, ESR, impact assessment report

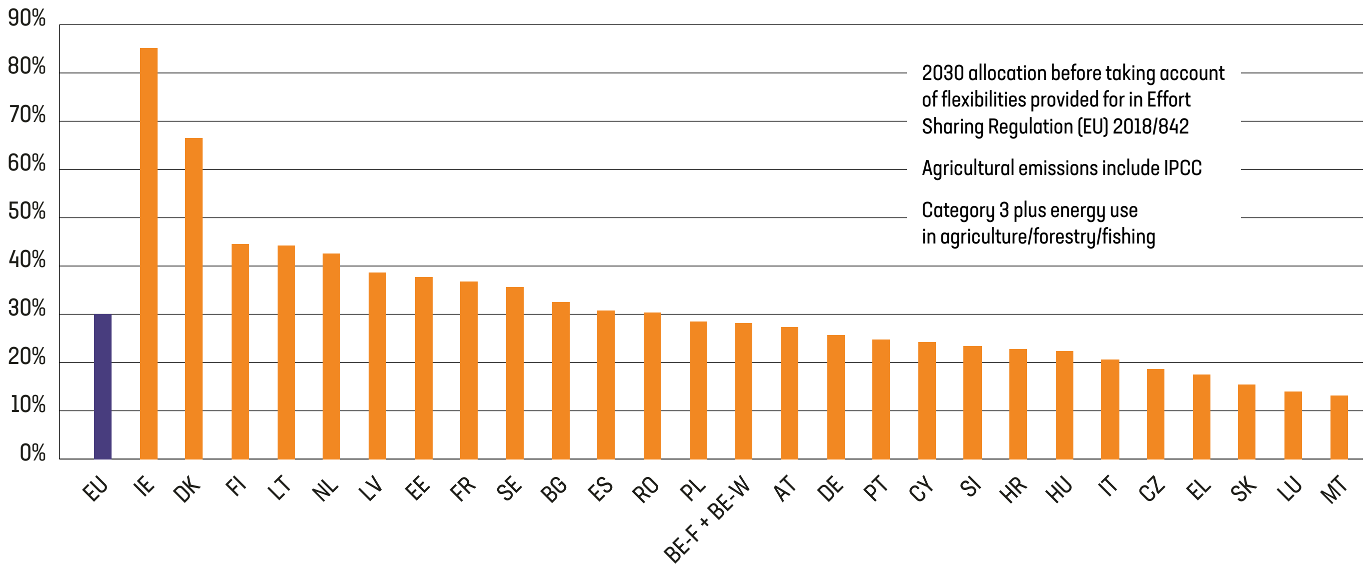
In some Member States, emissions from agriculture are central for achieving ESR targets.

Figure 12 [72] illustrates the comparison of 2021 agricultural emissions with the total (all ESR sector) emissions that Member States are allowed to emit under the ESR in 2030 [73]. The percentage for each Member State indicates the share of agricultural emissions in relation to the 2030 ESR emissions limit. For example, the EU value indicates that emissions from the agricultural sector in 2021 represent 30% of the limit expected for all ESR emissions in 2030. This ratio varies significantly across Member States, ranging from approximately 85% (in Ireland) to 15% (in Malta).

Member States with a relatively small proportion of agricultural emissions over the total ESR emissions have more flexibility, compared to those Member States with relatively higher ratio, to intervene to tackle agricultural emissions if they can meet their ESR targets through reductions in other ESR sectors. Conversely, in the latter reducing emissions from agriculture becomes central to achieving the ESR target.

[70] See footnote 12 (Table 3 p. 30 excludes fossil fuel combustion in the sector, but includes 'category 3' CO_2 emissions, assumed constant at 10 Mt CO_2).
[71] Files for the mix scenario are accessible here: https://circabc.europa.eu/ui/group/8f5f9424-a7ef-4dbf-b914-1af1d12ff5d2/library/b37f5188-8c53-4bfa-8a7c-5096960cd6f1/details?download=true.
[72] Alan Matthews keynote speech at the online workshop on 14 March 2024 'Building on the NECP for the land sector: Member State workshop' hosted by DG Clima. The graph is very similar if the 2021 data are replaced with the average from 2018 to 2022.
[73] Not taking into account the flexibility mechanisms in Article 5 (Flexibilities by means of borrowing, banking and transfer) and Article 6 (Flexibility for certain Member States following reduction of EU ETS allowances) of the Effort Sharing Regulation (EU) 2018/842.

Figure 12. 2021 agricultural emissions as a share of 2030 ESR annual allocation



Source: Alan Matthews based on EEA and ESR data

The role of the CSP in addressing emissions from agriculture varies among Member States and does not always reflect the importance of agricultural emissions in the total emission targets. Applying the same approach as above at EU level, differences at Member State level are further detailed below (Figure 13, Figure 14 and in Annex 5 – Estimated potential contribution of the CSPs compared with the national inventories emissions and with the 2030 emission level for agriculture defined in the impact assessment for the Fit for 55 package, detailed per Member State).

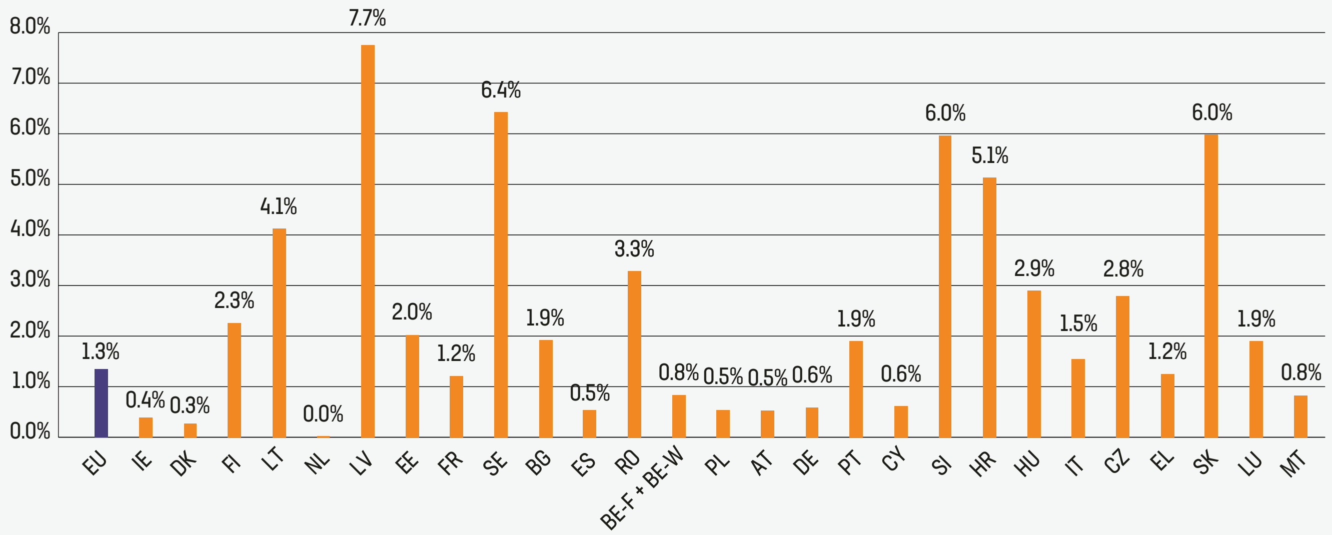
Figure 13 presents the estimated potential contribution of the each CSP as a percentage of GHG emissions from agriculture. It varies from a negligeable share in the Netherlands to nearly 8% in Latvia.

Figure 13. Estimated mitigation potential (in CRF category 3) as a share of the emissions from agriculture reported in the national GHG inventory (average 2018-2022)

Member State order follows the one in Figure 12 to facilitate the comparison.

Data for Belgium-Flanders and Belgium-Wallonia are aggregated to align to with the data reported to the UNFCCC.

Example on how to read the graph: overall, the estimated yearly mitigation potential in CRF category 3 of Latvia (LV) assessed accounts for 7.7% of the emissions estimated for the national GHG inventory (average 2018-2022 annual emissions).



Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other sources, EEA

It can be noted that for Ireland, Denmark and the Netherlands, where the current agricultural emissions represent a relatively high share of 2030 ESR emission level for agriculture defined in the mix scenario of the Fit for 55 impact assessment (Figure 12), the current study estimates a relatively low potential contribution for their CSPs to reduce emissions from the agricultural sector. By contrast, for Member States such as Slovenia, Croatia or Slovakia, the current agricultural emissions represent a relatively low share of the 2030 emission level defined in the impact assessment, and the current study estimates show a relatively high potential for their CSPs to reduce emissions from the agricultural sector compared to the current levels.

This study is assessing only the role of the CSP. Several Member States have also set in place other policies and measures to address emissions in agriculture. It is also important to note that the approach applied does not provide an estimation of the additional effect of the instruments of the 2023-2027 CAP compared to the previous period and that the methodology applied differs from the IPCC methodological guidance on several points.

Finally, compared to the distance to the 2030 emission level, the estimated potential reduction contribution of the CSPs at Member State level is detailed below (Figure 14, and in Annex 5 - Estimated potential contribution of the CSPs compared with the national inventories emissions and with the 2030 emission level for agriculture defined in the impact assessment for the Fit for 55 package, detailed per Member State).

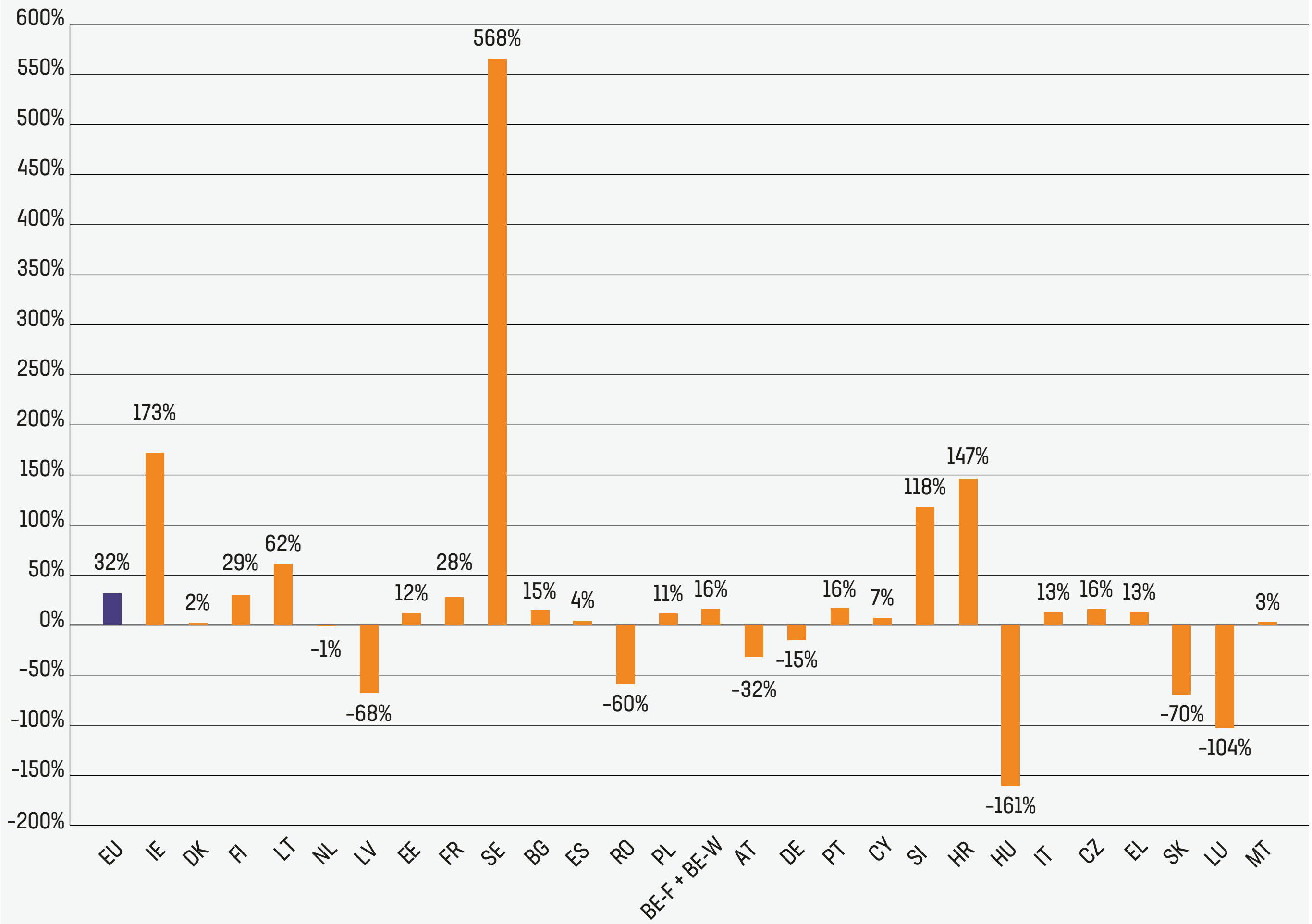
Figure 14. Estimated mitigation potential as a share of the distance to the 2030 emission level for agriculture defined in the impact assessment (mix scenario)

Member State order follows the one in Figure 12 to facilitate the comparison.

Data for Belgium-Flanders and Belgium-Wallonia are aggregated to align to the data reported to the UNFCCC.

The distance to the 2030 emission level defined in the impact assessment is the difference between the current emissions levels reported in national inventories in CRF category 3 (average 2018-2022) and the emission level for the agricultural sector in 2030 as defined in the mix scenario of the Fit for 55 impact assessment. Negative values mean that the modelled 2030 emission level is below the emission levels reported in the national inventories.

Example on how to read the graph: in Ireland (IE), the estimated yearly mitigation potential in CRF category 3 accounts for about 173% of the distance to the 2030 emission level defined in the impact assessment.



Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other sources, EEA, ESR, impact assessment report

For the Member States with negative values (Latvia, Romania, Austria, Germany, Hungary, Slovakia and Luxembourg), the figure associated with agriculture for 2030 as modelled in the impact assessment of the Fit for 55 package (at national level) is below current estimated emissions (2018-2022 average). For the others, the estimated potential contribution of CSPs represents up to 568% in the case of Sweden of distance to the 2030 emission level for agriculture as modelled in the impact assessment.

5.2. LULUCF Regulation (EU) 2018/841 and removal values

Since 2023, the LULUCF Regulation (EU) 2018/841 [74] sets an EU-wide net removal target of 310 Mt CO_2e by 2030, with specific targets assigned to each Member State [75]. Based on the sector's average sink between 2016 and 2018, in order to achieve the EU target, an increase in carbon sink capacity of 42 Mt CO_2e is required.

Focusing on the farming practices contributing to increased CO_2 removals within the LULUCF scope, the analysis suggests that the CSPs could contribute to enhancing carbon sequestration by approximately 30 Mt CO_2e on average every year, mainly in relation to cropland (Table 1. CRF category 4.B).

Achieving the LULUCF target involves reducing net emissions of CO_2 from agricultural areas and other land uses and/or increasing carbon removals. The approach applied in the current study provides an estimation of the potential contribution of CSP interventions and GAECs towards this target.

As reported in Table 3, **the CSPs are estimated to potentially contribute to**:

- **10% of the LULUCF 2030 target**; and
- **71% of the required increase in sink capacity to achieve the LULUCF 2030 target**.

As illustrated in the last column of Table 3, the estimated contributions vary significantly among Member States. For instance, in Sweden, Estonia, Slovenia, Cyprus, Ireland and the Netherlands, this study estimates that the yearly potential contribution from their CSP is relatively low (around or below 35% of the relative target 2030, i.e. the required increase), while it is significantly higher in Czechia, Hungary, Slovakia, Greece, Latvia, Bulgaria and Denmark. In these Member States, this study estimates that the potential contribution from their CSPs could exceed the required increase.

Table 3. Estimated potential contribution to enhanced sequestration compared to national targets for net removals set in the LULUCF regulation (EU) 2018/841

The second column reports the estimated potential contribution (all types of intervention and GAECs are included) of farming practices that contribute to enhancing annual stock change emissions and removals from LULUCF (i.e. CRF category 4) supported by the CSPs.

The third column shows the national target values for 2030 (end-point 2030) as set in Annex II of LULUCF Regulation (EU) 2018/841 (column D). The fourth column presents the ratio between the CSPs estimated potential contributions and these 2030 target values.

The fifth column shows the relative 2030 target, referenced to the average sink of the sector in 2016-2018, as set in Annex II of LULUCF Regulation (EU) 2018/841 (column C). The last column shows the ratio between the estimated potential contribution and these related 2030 targets.

Example on how to read the table: in Spain (ES), the CSP estimated potential contribution on the CRF category 4 represents in absolute value 6% of the net emissions targeted in 2030 (end-point) for the country in the LULUCF sector, and 48% of the relative target 2030 (gap) required to reach this target.

	Estimated contribution on CRF cat. 4 (kt CO_2e) A	LULUCF reg. end-point 2030: GHG net removals in 2030* (kt CO_2e) B	% of the estimated contribution over the 2030 end-point A/B	LULUCF reg. relative target 2030: gap to 2030 level (kt of CO_2e) C	% of the estimated contribution over 2030 relative target A/C
AT	524	-5 650	9%	-879	60%
BE	216	-1 352	-16%	-320	-67%
BG	1 357	-9 718	-14%	-1 163	-117%
CY	22	-352	-6%	-63	-34%

[74] See footnote 11.
[75] Annex II of LULUCF Regulation (EU) 2018/841.

	Estimated contribution on CRF cat. 4 (kt CO_2e) A	LULUCF reg. end-point 2030: GHG net removals in 2030* (kt CO_2e) B	% of the estimated contribution over the 2030 end-point A/B	LULUCF reg. relative target 2030: gap to 2030 level (kt of CO_2e) C	% of the estimated contribution over 2030 relative target A/C
CZ	1 735	-1 228	-141%	-827	-210%
DE	2 826	-30 840	-9%	-3 751	-75%
DK	492	5 338	9%	-441	-112%
EE	114	-2 545	-4%	-434	-26%
EL	1 589	-4 373	-36%	-1 154	-138%
ES	2 549	-43 635	-6%	-5 309	-48%
FI	2 019	-17 754	-11%	-2 889	-70%
FR	3 675	-34 046	-11%	-6 693	-55%
HR	276	-5 527	-5%	-593	-47%
HU	1 941	-5 724	-34%	-934	-208%
IE	217	3 728	6%	-626	-35%
IT	2 569	-35 758	-7%	-3 158	-81%
LT	402	-4 633	-9%	-661	-61%
LU	21	-403	-5%	-27	-77%
LV	816	-644	-127%	-639	-128%
MT	2	2	85%	-2	-85%
NL	154	4 523	3%	-435	-35%
PL	2 798	-38 098	-7%	-3 278	-85%
PT	836	-1 358	-62%	-968	-86%
RO	975	-25 665	-4%	-2 380	-41%
SE	893	-47 321	-2%	-3 955	-23%
SI	67	-146	-46%	-212	-32%
SK	748	-6 821	-11%	-504	-148%
EU	**29 833**	**-310 000**	**-10%**	**-42 295**	**-71%**

* the LULUCF Regulation (EU) 2018/41 report data at Member State level, therefore, estimates for Belgium-Flanders and Belgium-Wallonia are aggregated

Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other sources, LULUCF Regulation (EU) 2018/841

6. Recommendations for improvements

The estimation process delivers rough estimates of the maximum potential contribution of the CAP interventions and GAECs in reducing GHG emissions, increasing carbon removals and protecting existing carbon sinks. These estimates come with levels of uncertainty contingent on the information available in the CSPs, the mitigation coefficients applied and the assumptions made to estimate the area where the farming practices are implemented.

While it is impossible to quantify the error level in the estimation precisely, the chosen approach, despite being conservative in applying coefficients and estimating areas, reflects the maximum potential contribution of CAP interventions. This is because it relies on the total planned output without the ability to distinguish newly covered areas from those where practices were implemented in the past and/or would be implemented regardless of CAP interventions. Additionally, it does not account for the actual uptake of the CAP interventions.

Several improvements can be suggested at different levels to enhance the accuracy of the results. They are addressed primarily to national authorities willing to enhance the quantification of their CSP for policy assessments and complement it with other national policies and measures for climate change. On the other hand, data and estimates can also be used by national inventory compilers for the sake of improving UNFCCC reporting.

From planning data to implementation values

Current limitations arise from the estimation of uptake levels, based on planned output available in the CSPs or estimated based on available data at the time of the study, and the linkages between farming practices identified in the CSPs and those in the classification drawn up by the JRC.

Results can be significantly improved:

- by replacing estimated areas with the actual uptake data of the interventions reported in the annual progress reports;
- with information on the interventions and/or farming practices already in place before 2023 versus actual implementation of new farming practices to focus on the additional effect of the current programming period compared to the previous period; and
- with better knowledge of local specificities to review certain assumptions, including to estimate the areas concerned by GAECs' standards, and to account for deadweight effect.

Moreover, the changes to the CSP regulation (particularly to GAEC 8 standards) and amendments to CSPs should be considered as well to enhance the accuracy of estimations.

Farming practices and coefficients

The study's estimates rely on a list of farming practices as per the JRC classification with available mitigation/protection coefficients. The emission coefficients derive mainly from iMAP, and in some instances, data used to report to the UNFCCC, which result in averaged values that may not properly represent specific conditions, such as local pedoclimatic situation, and effect the coefficient value.

Therefore, the following is recommended:

- Revise coefficient values to account for geographical specificities (adapted to biogeographical zones or national level), especially for coefficients with the lowest accuracy and contributing most to the total estimate.
- Set coefficient values (based possibly on national data) related to methane (CH_4) emissions from enteric fermentation and non-CO_2 emissions from manure management, which remain major sources of emissions.
- Revise the coefficients related to the maintenance of practices for more accurate values.

Risk of double counting

As mentioned, the approach assumes that GAEC standards provide the basis to calculations and that interventions are carried out on the top of and beyond GAEC standards: eco-schemes followed by ENVCLIM and finally INVEST. This means that when a risk of overlap is identified, the priority order above is respected. There too, the approach developed to avoid double counting can be improved with more accurate knowledge on the implementation of the CSPs.

Annex 1 – Farming practice emissions and removal coefficients

Table 4 below presents an overview of the coefficient values associated with each farming practice as per the JRC classification [76].

These GHG emissions mitigation and carbon removal coefficients are primarily sourced from JRC work in the iMAP project [77] and from other sources in an evaluation study of the impact of the CAP on climate change and GHG emissions [78], supplemented with additional data from national inventory submissions, specifically the common reporting format tables. Full details of the selection of these coefficients are included in the general methodology deliverable [79].

The table below reports only the farming practices for which a coefficient value exists, i.e. a significant effect is documented in the sources mentioned.

'**Coefficient value – range of the mean value**' indicates the mean value(s) of the coefficient. As explained in the general methodology deliverable [80], these coefficients primarily refer to *grand means* calculated from many individual studies, usually from many countries. In some cases, more specific values are also available for specific countries. The original value can thus be replaced by country-specific coefficients (e.g. if the modifier is a typical SOC stock value for a country) or if it can be modified e.g. for converting from one unit to another (e.g. emissions of N_2O to emissions expressed as CO_2e). For certain coefficients, the indication 'From-to' provides the highest and lowest coefficient mean values, depending on the Member State. When there is one value in the table, the mitigation potential is identical for all the Member States.

The section '**SOC and type of gas (example for Ireland)**' breaks down the mean value in the different types of gas and SOC that constitute it.

'**CRF Cat. or Protection**' reports the categor(ies)y under which the effect of the farming practice is categorised if the estimated contribution concerns the mitigation potential. Otherwise, 'Protection' is reported if the estimated contribution concerns the carbon stock protection potential.

'**Main effect**' provides clarification on the type of effect.

'**Source**' reports the source of the coefficients (i.e. either JRC or other sources).

Table 4. Detail on farming practices, range of potential contribution, type of gas, main effect and CRF category

Practices	Coefficient value – range of mean value	Units	SOC and type of gas (example for Ireland)				CRF cat. or protection	Main effect	Source
			N_2O	CH_4	SOC	CO_2			
A21 – Animal trait selection for GHG emission	-18	kg CO_2e/head/yr	-4	-13			3.A	Reduction of non-CO_2 emissions	Other sources
A23 – Animal trait selection for longer lifespan	-378	kg CO_2e/head/yr	-94	-283			3.A	Reduction of non-CO_2 emissions	Other sources
B21X – Biogas	-4 780 770	kg CO_2e/MW				-4 780 770	1.A.4.c	Energy	Other

[76] See footnote 34.
[77] See footnote 35.
[78] See footnote 42.
[79] See footnote 38.
[80] See footnote 38.

Practices	Coefficient value - range of mean value	Units	SOC and type of gas (example for Ireland)				CRF cat. or protection	Main effect	Source
			N_2O	CH_4	SOC	CO_2			
B22 - Wind energy	-159 125	kg CO_2e/MW				-159 125	1.A.4.c	Energy	Other
B23 - Solar energy B24 - Other renewable energy production B2X - Renewable energy production	-75 774	kg CO_2e/MW				-75 774	1.A.4.c	Energy	Other
E111 - Variable rate application technologies - fertilisers E11X - Variable rate application technologies E14 - Soil mapping E1X - Precision agriculture	-190	kg CO_2e/ha/yr	-171	-19			3.D	Reduction of non-CO_2 emissions	Other sources
F112 - Ban on mineral fertiliser	from -4 843 to -181	kg CO_2e/ha/yr	-4 843				3.D	Reduction of non-CO_2 emissions	n/a
F11X - Ban on fertilisation on areas other than along watercourses F12X - Limitation on fertiliser quantity F14 - Ban and restrictions of fertilisers on limited areas of the field other than along water courses F1X - Limitations on the use of fertilisers	-138	kg CO_2e/ha/yr	-138				3.D	Reduction of non-CO_2 emissions	Other sources

Practices	Coefficient value – range of mean value	Units	SOC and type of gas (example for Ireland)				CRF cat. or protection	Main effect	Source
			N_2O	CH_4	SOC	CO_2			
F211 – Deep placement (mineral fertilisers) or deep injection	From -3 to -1	kg CO_2e/ha/yr		-2			3.D	Reduction of non-CO_2 emissions	JRC
F21X – Fertilisation practices with a focus on low ammonia emissions F2X – Fertilisation practices to reduce nutrient losses	-13	kg CO_2e/head/yr	-13				3.D	Reduction of non-CO_2 emissions	Other sources
F311 – Application of raw biochar F31X – Amendment with Biochar	From -4 632 to -1897	kg CO_2e/ha/yr	-1 470				3.D	Reduction of non-CO_2 emissions	JRC
		kg CO_2e/ha/yr			-2 916		4.B	Increase of sink/removal	JRC
F411 – Slow/controlled release fertilisers	From -2 397 to -92	kg CO_2e/ha/yr	-2 397				3.D	Reduction of non-CO_2 emissions	JRC
F44 – Use of green manure	From -2 771 to -853	kg CO_2e/ha/yr	-1 635				3.D	Reduction of non-CO_2 emissions	JRC
		kg CO_2e/ha/yr			-1 136		4.B	Increase of sink/removal	JRC
F46 – Use of compost	-4 840	kg CO_2e/ha/yr			-4 840		4.B	Increase of sink/removal	JRC
G25 – Ban of ploughing of grassland G26 – No conversion of grassland into other uses	from -3 250 to -406	kg CO_2e/ha/yr			-2 012		Protection	Protection of sinks (in soil and biomass)	JRC

Practices	Coefficient value – range of mean value	Units	SOC and type of gas (example for Ireland)				CRF cat. or protection	Main effect	Source
			N_2O	CH_4	SOC	CO_2			
G27 – Conversion of arable land to grassland	From – 4 631 to –578	kg CO_2e/ha/yr			-2 867		4.B	Increase of sink/removal	JRC
L111 – Creation of new hedges/wooded strips	- 3 281	kg CO_2e/ha/yr			-3 281		4.B	Increase of sink/removal	JRC
L11X – Hedgerows/individual or group of trees/ trees in line	-3 281	kg CO_2e/ha/yr			-3 281		Protection	Protection of sinks (in soil and biomass)	JRC
L112 – Maintenance and conservation of hedges/wooded strips	-965	kg CO_2e/ha/yr			-965		Protection	Protection of sinks (in soil and biomass)	JRC
L121 – Creation of field margins L125 – Creation of unproductive buffer strips along watercourses L211 – Seeded flower areas/strips	From –2 767 to – 1 054	kg CO_2e/ha/yr			-1 839		4.B	Increase of sink/removal	JRC
L512 – Peatland maintenance and conservation L51X – Wetlands and peatland maintenance and conservation	-6 417	kg CO_2e/ha/yr			-6 417		Protection	Protection of sinks (in soil and biomass)	Other sources
L522 – Peatland restoration L52X – Wetlands and peatland restoration	-22 392	kg CO_2e/ha/yr	-209				3.D	Reduction of non-CO_2 emissions	Other sources and JRC
		kg CO_2e/ha/yr			-22 183		4.D	Reduction of emissions from drained peatland	

Practices	Coefficient value - range of mean value	Units	SOC and type of gas (example for Ireland)				CRF cat. or protection	Main effect	Source
			N_2O	CH_4	SOC	CO_2			
L53 - Paludiculture	-6 417	kg CO_2e/ha/yr			-6 417		4.D	Reduction of emissions from drained peatland	Other sources
L5X - Management of wetland/ peatland	-796	kg CO_2e/ha/yr			-796		4.D	Reduction of emissions from drained peatland	Other sources
M114 - Manure acidification during storage	From -304 to -79	kg CO_2e/ha/yr	-15	-165			3.B	Reduction of non-CO_2 emissions	JRC
M121 - Composting without forced aeration M122 - Composting with forced aeration M12X - Composting	From -98 to -35	kg CO_2e/ha/yr	-17	-35			3.B	Reduction of non-CO_2 emissions	JRC
M141 - Solid-liquid separation	From -66 to -12	kg CO_2e/ha/yr	0	-41			3.B	Reduction of non-CO_2 emissions	JRC
O11 - Maintenance of organic farming practices	-1650	kg CO_2e/ha/yr		-3	-1 650		Protection	Protection of sinks (in soil and biomass)	JRC
O12 - Conversion to organic farming practices O1X - Organic farming	-2 150	kg CO_2e/ha/yr	-497	-3			3.D	Reduction of non-CO_2 emissions	JRC
					-1 650		4.B	Increase of sink/removal	JRC

Practices	Coefficient value - range of mean value	Units	SOC and type of gas (example for Ireland)				CRF cat. or protection	Main effect	Source
			N_2O	CH_4	SOC	CO_2			
R11 - Crop rotation R14 - Crop diversification R1X - Crop rotation or Crop diversification	From -506 to -193	kg CO_2e/ha/yr			-336		4.B	Increase of sink/removal	JRC
R121 - Cultivation of nitrogen-fixing/protein crops	-243	kg CO_2e/ha/yr	-243				3.D	Reduction of non-CO_2 emissions	Other sources
R131 - Short-term fallow	-513	kg CO_2e/ha/yr			-513		4.B	Increase of sink/removal	JRC
R13X - Land laying fallow	-990	kg CO_2e/ha/yr			-990		4.B	Increase of sink/removal	JRC
R15 - Multicropping/mixed cropping/intercropping	From -1 676 to -638	kg CO_2e/ha/yr			-1 366		4.B	Increase of sink/removal	JRC
R17 - Catch crops S232 - Winter cover crop S23X - Cover crops S25 - Green cover on permanent crops S2X - Soil cover	-770	kg CO_2e/ha/yr			-770		4.B	Increase of sink/removal	JRC
S22 - Crop residues left on soil	-150	kg CO_2e/ha/yr			-150		4.B	Increase of sink/removal	Other sources

Practices	Coefficient value – range of mean value	Units	SOC and type of gas (example for Ireland)				CRF cat. or protection	Main effect	Source
			N_2O	CH_4	SOC	CO_2			
Y11 – Afforestation of agricultural land Y21 – Forest restoration and reforestation	-14 832	kg CO_2e/ha/yr			-14 832		4.A	Increase of sink/removal	Other sources
Y12 – Maintenance of afforested land	-8 763	kg CO_2e/ha/yr			-8 763		Protection	Protection of sinks (in soil and biomass)	Other sources
Y22 – Sustainable Forest management (e.g. for biodiversity carbon sequestration fire genetic resources, clearance) Y2X – Forest management	-12 600	kg CO_2e/ha/yr			-12 600		Protection	Protection of sinks (in soil and biomass)	Other sources

Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on iMAP and other sources

Annex 2 – Farming practices without data

The farming practices reported in Table 5 are those from the JRC farming practices classification for which no coefficient value is established in the study:

- 'no data' indicates that suitable data are not available for this study; and
- 'mitigation effect not known' means that currently there is not sufficient evidence in the systematic analysis of available meta-reviews of the scientific literature by the JRC to conclude whether a positive effect can be expected. However, this does not exclude the possibility that a positive effect exists in practice.

The practices reported below are the ones that appear the most frequently in the CSPs according to the labelling of the CSPs interventions and GAECs [81]. Farming practices at Tier 1 level are not considered here, as they are too generic, while Tiers 2 and 3 are deemed more pertinent for describing CSPs specifications.

Table 5. Selection of JRC farming practices with mitigation potential effects not known or missing data

Section	JRC farming practices (Tier 2 and Tier 3)		Occurrences in CAP EH labelling*
Animals	A14 – Feed additives	Mitigation effect expected-data available in iMAP for future refinements	65
	A15X – Optimised feeding plans	Mitigation effect not known	139
	A32 – Specific treatment plants	No data	114
	A51X – Outdoor access	No data	136
	A52 – Provision of enrichment materials	No data	79
	A53 – Improved litter and indoor flooring	No data	146
	A54 – Microclimate control	No data	100
	A57 – Monitoring and regular checking of the herd	Mitigation effect not known	111
Fertilisation and soil amendments	F124 – Max N input	No data	236
	F13 – Limitations on fertiliser timing	No data	53

[81] Above 50 occurrences.

Section	JRC farming practices (Tier 2 and Tier 3)		Occurrences in CAP EH labelling*
Grassland and grazing	G11 – Minimum grazing period	No data	89
	G12 – None or restricted grazing (timing, animal species, etc.)	No data	192
	G131 – Minimum stocking density	No data	101
	G132 – Maximum stocking density (extensive grasslands)	No data	196
	G13X – Livestock density limitation	No data	56
	G16 – Rotational grazing	Mitigation effect expected-data available in iMAP for future refinements	50
	G21 – Mowing obligations	Mitigation effect not known	163
	G221 – Mowing restriction on timing	Mitigation effect not known	208
	G222 – Mowing restriction of number of cuts	Mitigation effect not known	52
	G223 – Other mowing restrictions	Mitigation effect not known	111
	G22X – Mowing restrictions (timing, number of cuts, etc.)	Mitigation effect not known	88
	G23 – Idling of grassland	Mitigation effect not known	62
Landscape	L12X – Field margins, patches and unproductive buffer strips along water courses	No data [82]	89
	L3X – Agroforestry	No data	60
	L45 – HNV systems	Mitigation effect not known	207
Crop rotation and diversification	R192 – Use of certified seeds	No data	215
Soil management	S21X – Mulching	No data	54
	S31 – Restricted machinery usage	No data	65

NB. November 2023 version (28 CSP)

Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on Mapping and analysis of CAP Strategic Plans

[82] L12X encompasses 'maintenance' and 'new implementation' farming practices (L121 (creation of field margins) and L122 (maintenance and conservation of field margins)). For conservative estimates, the 'maintenance' coefficient is applied to L12X; in this case it is zero, due to lack of data for a better approximation.

Annex 3 – Estimated mitigation potential contribution of eco-schemes and ENVCLIM per CSP and farming practice

Table 6. Estimated mitigation potential of the eco-scheme type of intervention per CSP and farming practice (%)

	AT	BEF	BEW	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	EU
R14 - Crop diversification				4.7%		0.1%	0.6%	0.4%					8.4%	0.1%		0.1%				0.2%		0.0%	1.8%						16%
S2X - Soil cover			0.4%			0.5%		0.2%			9.8%											0.3%							11%
F46 - Use of compost		0.4%		1.0%	0.0%	1.5%				4.4%																		2.6%	10%
S232 - Winter cover crop										0.5%		7.7%			1.3%												0.0%		10%
O12 - Conversion to organic farming practices				0.2%				0.7%	0.2%									0.2%						3.7%		3.3%			8%
S25 - Green cover on permanent crops				0.0%		0.2%				0.2%			0.0%		0.1%		6.9%												8%
R17 - Catch crops	2.6%			0.2%		0.2%		0.1%	0.3%									0.6%	0.0%	0.2%		0.2%	1.7%			1.0%	0.1%	0.1%	7%
L211 - Seeded flower areas/strips						1.4%	2.5%			0.5%							1.5%	0.1%		0.3%			0.5%					0.0%	7%
S22 - Crop residues left on soil, leaving stubbles on the field						0.0%									0.3%		1.0%						2.8%		0.4%				4%

	AT	BEF	BEW	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	EU
R121 - Cultivation of nitrogen fixing/protein crops		0.0%	0.0%			0.2%	0.1%		0.2%	0.2%				0.0%	0.5%		1.2%	0.1%		0.0%		0.0%			1.0%				4%
E1X - Precision agriculture								0.0%		0.0%						0.2%				0.3%		0.0%				1.8%			2%
R11 - Crop rotation		0.1%									2.1%																		2.2%
L125 - Creation of unproductive buffer strips along watercourses		0.0%		0.0%		1.4%		0.4%																					1.9%
F112 - Ban on mineral fertilisers		0.1%								0.0%				0.7%				0.4%	0.1%								0.5%		1.9%
F11X - Ban on the use of fertilisers other than along water courses						0.2%	0.5%	0.0%				0.1%						0.3%											1.2%
F44 - Use of green manure				0.4%		0.5%														0.2%									1.0%
R13X - Land laying fallow						0.6%		0.3%	0.1%		0.1%		0.0%																1.0%
G27 - Conversion of arable land to grassland						0.6%												0.1%											0.7%
S23X - Cover crops	0.2%																			0.4%									0.7%
L111 - Creation of new hedges/wooded strips				0.0%									0.3%			0.0%						0.2%							0.5%

	AT	BEF	BEW	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	EU
L121 - Creation of field margins		0.0%		0.0%				0.3%		0.0%												0.1%							0.5%
R131 - Short-term fallow						0.3%																							0.3%
F12X - Limitation on fertiliser quantity						0.1%								0.1%													0.0%		0.2%
S23X - Cover crops				0.2%																									0.2%
R15 - Multicropping/ mixed cropping/ intercropping			0.0%													0.0%						0.0%							0.1%
S26 - Crop residue incorporated into the soil																												0.1%	0.1%
F411 - Slow/controlled release fertilizers										0.1%																			0.1%
E11X - Variable rate application technologies						0.1%																							0.1%
Total	2.8%	0.7%	0.5%	6.7%	0.0%	8.0%	3.6%	2.5%	0.7%	5.9%	12.0%	7.8%	8.7%	0.9%	2.2%	0.3%	10.7%	1.8%	0.1%	1.7%	0.0%	0.9%	6.8%	3.7%	1.3%	6.0%	0.7%	2.8%	100%

Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other sources

Table 7. Estimated mitigation potential of the ENVCLIM type of intervention per CSP and farming practice (%)

	AT	BEF	BEW	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	Total
O12 - Conversion to organic farming practices		0.2%	0.1%	1.1%	0.1%	1.5%	7.4%			2.9%	3.9%	5.5%	20.0%	0.8%	1.8%	1.8%	0.1%	0.4%	0.1%	4.1%	0.0%		4.5%	0.0%	3.3%		0.2%	0.3%	59.8%
L52X - Wetland and peatland restoration							4.0%										5.4%												9.4%
F112 - Ban on mineral fertilisers			0.1%	0.2%			0.3%						0.0%	0.0%	0.1%										3.5%		0.1%	0.7%	5.1%
L211 - Seeded flower areas/strips		0.0%			0.0%	1.9%	1.1%							0.0%	0.5%				0.0%					0.4%					3.9%
R17 - Catch crops						0.0%	0.3%					2.1%											0.0%					0.0%	2.5%
R14 - Crop diversification	0.7%						0.9%				0.2%	0.3%			0.1%														2.3%
F46 - Use of compost												2.1%	0.0%				0.1%		0.0%										2.2%
R11 - Crop rotation					0.0%		1.1%						0.0%				0.9%				0.0%		0.0%				0.1%		2.2%
F1X - Limitations on the use of fertilisers	0.3%					0.2%	0.2%				1.0%				0.0%		0.0%				0.0%			0.1%					1.8%
G27 - Conversion of arable land to grassland		0.1%				0.1%	1.0%										0.1%		0.0%									0.0%	1.3%

	AT	BEF	BEW	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	Total
F11X - Ban on the use of fertilisers other than along watercourses		0.0%	0.0%			0.1%	0.2%		0.0%	0.0%							0.0%			0.0%			0.1%			0.6%	0.0%		1.1%
S25 - Green cover on permanent crops					0.0%	0.0%						0.0%	0.1%				0.8%		0.0%		0.0%						0.0%		1.0%
Y11 - Afforestation of agricultural land							0.4%			0.3%							0.1%							0.1%					1.0%
Y21 - Forest restoration and reforestation											0.5%									0.5%									1.0%
S23X - Cover crops							0.1%				0.7%		0.0%				0.1%												0.8%
L121 - Creation of field margins			0.0%				0.0%							0.0%	0.5%	0.1%									0.1%				0.7%
F12X - Limitation on fertiliser quantity							0.0%															0.0%	0.6%				0.0%		0.6%
F44 - Use of green manure						0.0%									0.3%		0.0%				0.0%						0.1%		0.5%
L125 - Creation of unproductive buffer strips along watercourses									0.1%			0.0%								0.1%						0.3%			0.4%
R13X - Land laying fallow							0.1%				0.2%										0.0%								0.3%

	AT	BEF	BEW	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	Total
L522 - Peatland restoration							0.0%					0.2%																	0.3%
S22 - Crop residues left on soil, leaving stubbles on the field							0.0%				0.1%				0.0%	0.1%						0.0%		0.0%				0.0%	0.3%
R121 - Cultivation of nitrogen fixing/ protein crops	0.0%	0.1%			0.0%		0.0%						0.0%		0.0%		0.0%		0.0%					0.0%			0.0%	0.0%	0.3%
L111 - Creation of new hedges/ wooded strips	0.0%				0.0%		0.0%				0.0%					0.2%													0.2%
L53 - Paludiculture							0.2%																						0.2%
S2X - Soil cover							0.0%						0.1%									0.0%	0.1%						0.2%
E14 - Soil mapping																												0.1%	0.1%
A21 - Animal trait selection for GHG emission																0.1%													0.1%
R15 - Multicropping/ mixed cropping/ intercropping		0.0%					0.1%						0.0%																0.1%

	AT	BEF	BEW	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	Total
E11X - Variable rate application technologies																	0.1%												0.1%
F11X - Ban on the use of fertilisers other than along watercourses																												0.1%	0.1%
Total	1.2%	0.3%	0.2%	1.3%	0.1%	3.9%	17.5%	0.0%	0.1%	3.2%	6.7%	10.3%	20.2%	0.8%	3.3%	2.2%	7.8%	0.4%	0.1%	4.6%	0.0%	0.0%	5.3%	0.7%	6.8%	0.9%	0.6%	1.3%	100%

Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other sources

Annex 4 – Estimated mitigation potential and estimated areas per farming practice

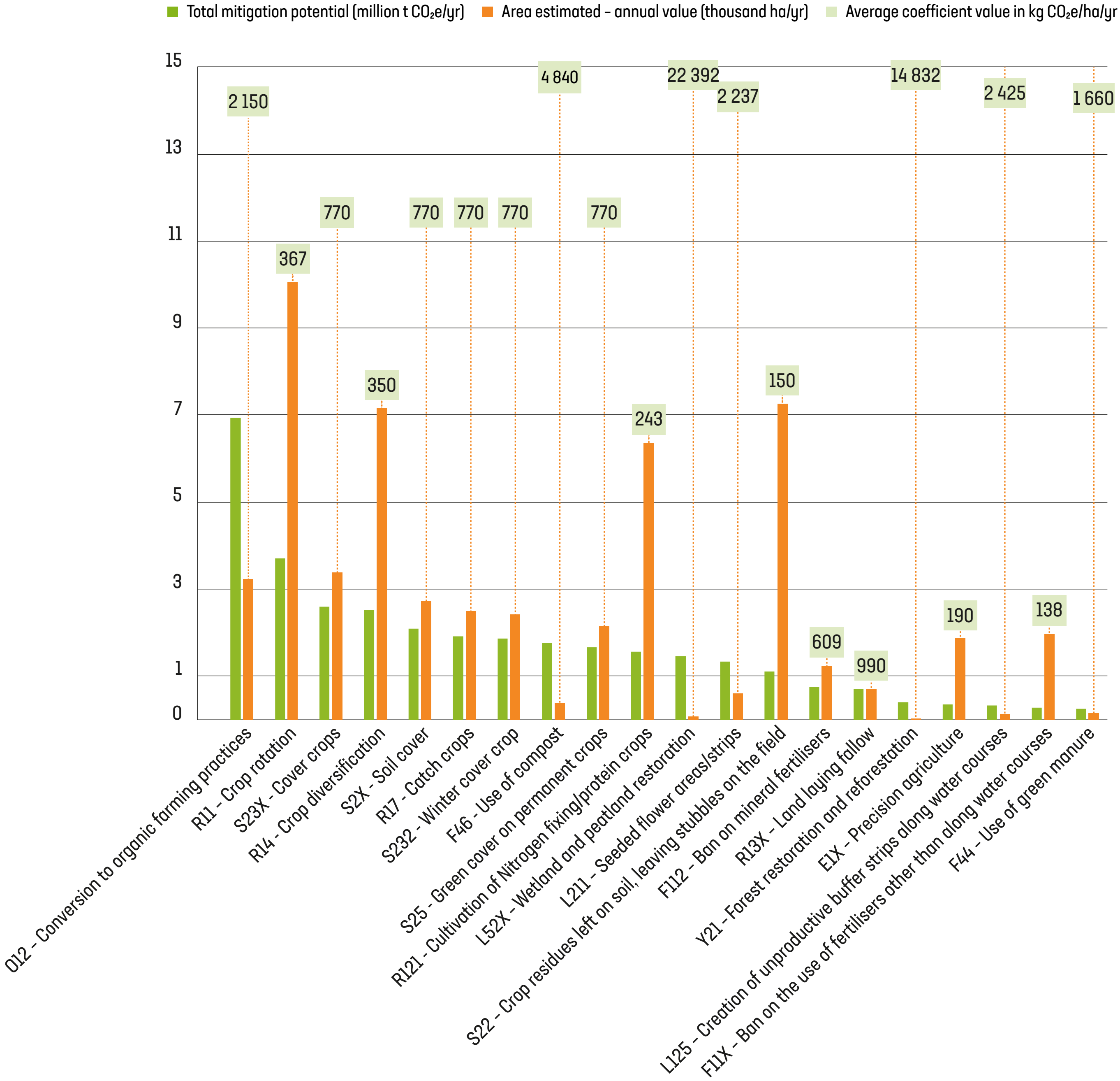
The 20 farming practices listed in Figure 15 are estimated to contribute to 95% of the total estimated mitigation potential (i.e. 35.1 Mt CO_2e annually).

The areas are the sum of the areas associated with each farming practice across all interventions and GAECs of all 28 CSPs, as estimated in this study.

The average coefficients are calculated by dividing the total estimated mitigation contribution by the sum of the areas.

The graph illustrates how the estimated effect at the farming practice level is explained by differences in the coefficient value (effect per hectare) and the estimated areas where this farming practice is applied. For example, R14 - Crop diversification and S23X – Cover crops contribute similarly to the estimated total potential contribution. R14 is expected to slightly enhance carbon removal over a larger area, while S23X is more effective but is estimated to be applied to a more limited area.

Figure 15. Estimated areas and mitigation potential, per farming practice, all types of intervention and GAECs included, in the 28 CSPs, and calculated EU average coefficients per farming practice



Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other sources

Annex 5 – Estimated potential contribution of the CSPs compared with the national inventory emissions and with the 2030 emission level for agriculture defined in the impact assessment for the Fit for 55 package, detailed per Member State

Table 8. Comparison of the estimated potential contribution of the CSPs with the average 2018-2022 national inventories emissions – CRF 3, and with the 2030 emission level for agriculture defined in the impact assessment for the Fit for 55 package, per Member State

	Estimated mitigation contribution ($ktCO_2e$)	Average 2018-2022 national inventory emissions – CRF 3 ($ktCO_2e$)	Fit for 55 Mix scenario 2030 value for agriculture ($ktCO_2e$)	Distance to 2030 emission level for agriculture defined in the impact assessment (mix scenario) ($ktCO_2e$)	Ratio of estimated potential to inventory data	Ratio of estimated potential to the distance to 2030 emission level for agriculture defined in the impact assessment
	A	B	C	D=C-B	A/B	A/D
AT	39	7 331	7 452	121	0.5%	32%
BE	51	9 429	9 111	-317	0.5%	-16%
BG	115	5 982	5 199	-783	1.9%	-15%
CY	3	518	474	-44	0.6%	-7%
CZ	233	8 346	6 868	-1 478	2.8%	-16%
DE	330	55 823	58 019	2 196	0.6%	15%
DK	32	11 875	10 540	-1 335	0.3%	-2%
EE	31	1 550	1 287	-262	2.0%	-12%
EL	102	8 196	7 397	-799	1.2%	-13%
ES	184	34 451	30 226	-4 225	0.5%	-4%
FI	140	6 217	5 739	-478	2.3%	-29%
FR	816	67 327	64 380	-2 947	1.2%	-28%
HR	136	2 656	2 563	-93	5.1%	-147%
HU	199	6 849	6 972	123	2.9%	161%
IE	87	22 240	22 190	-50	0.4%	-173%
IT	497	32 396	28 486	-3 910	1.5%	-13%

	Estimated mitigation contribution (ktCO$_2$e)	Average 2018-2022 national inventory emissions - CRF 3 (ktCO$_2$e)	Fit for 55 Mix scenario 2030 value for agriculture (ktCO$_2$e)	Distance to 2030 emission level for agriculture defined in the impact assessment (mix scenario) (ktCO$_2$e)	Ratio of estimated potential to inventory data	Ratio of estimated potential to the distance to 2030 emission level for agriculture defined in the impact assessment
	A	B	C	D=C-B	A/B	A/D
LT	174	4 232	3 949	-283	4.1%	-62%
LU	13	690	702	13	1.9%	104%
LV	171	2 210	2 462	251	7.7%	68%
MT	1	85	60	-25	0.8%	-3%
NL	4	18 360	18 948	588	0.0%	1%
PL	281	33 668	31 226	-2 443	0.8%	-11%
PT	136	7 171	6 346	-825	1.9%	-16%
RO	618	18 811	19 847	1 036	3.3%	60%
SE	417	6 492	6 418	-73	6.4%	-568%
SI	105	1 754	1 666	-89	6.0%	-118%
SK	124	2 076	2 254	178	6.0%	70%
EU	5 039	376 733	360 782	-15 951	1.3%	-32%

Source: EU CAP Network supported by the European Evaluation Helpdesk for the CAP (2025) based on CSPs, Mapping and analysis of CAP Strategic Plans, iMAP and other sources, EEA, ESR and impact assessment report

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Funded by
the European Union